ROMI®

User Manual

U37613A

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CHAPTER 1

INTRODUCTION

1.1. SUBDIVISION

This manual is aimed at installation, transportation and maintenance technicians, and includes technical descriptions, requirements and drawings.

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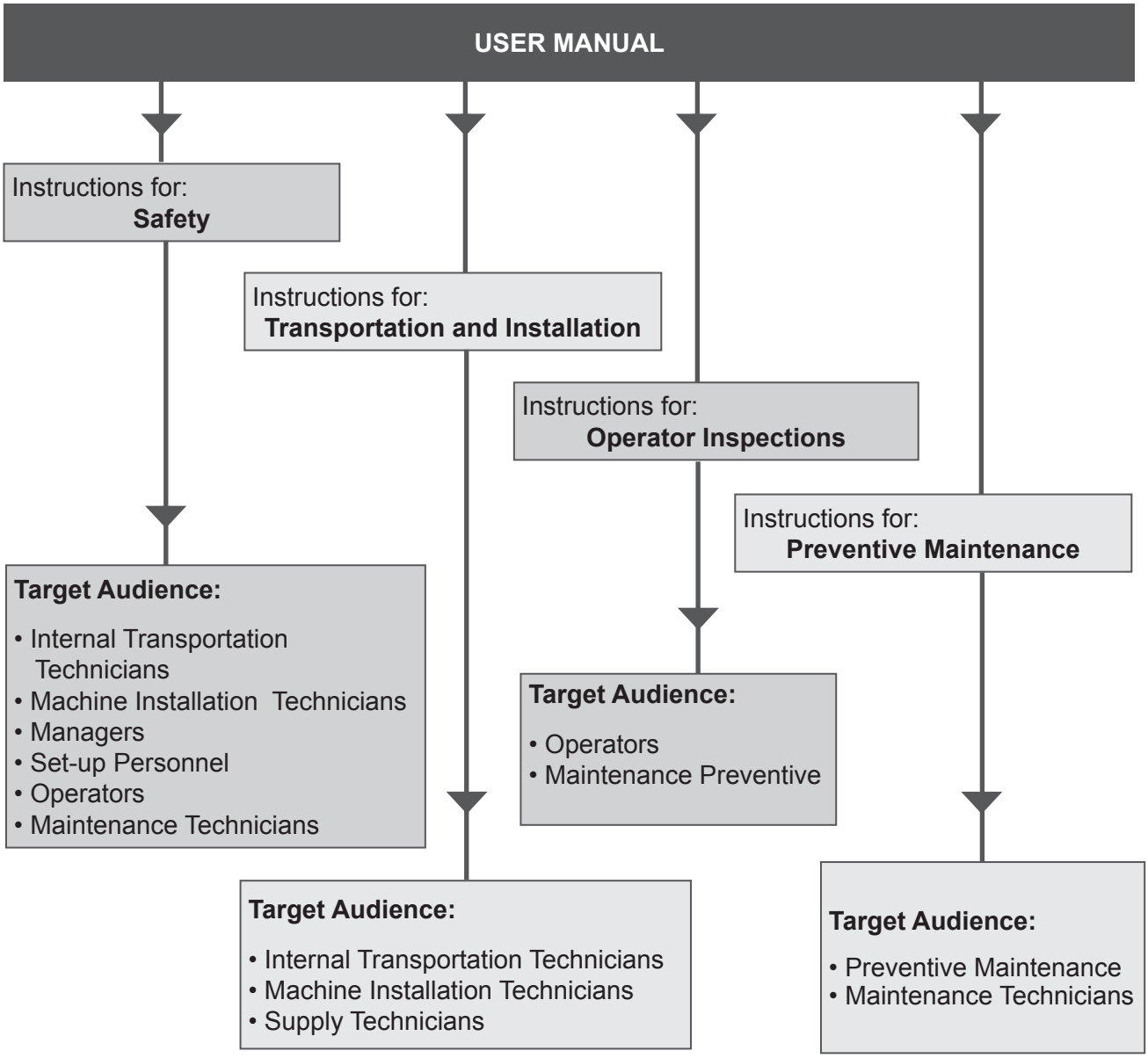


NOTE

Indústrias ROMI S/A reserves itself the right to make changes in the machine project, as well as in all of its technical specifications, without any previous notice.

1.2. NORMALIZATION

Along with the machine documentation, follow the product Declaration of Conformity, that lists all the regulatory standards and technical standards for the manufacture and sale of machine tools.

CHAPTER 2

TECHNICAL ASSISTANCE

Search for the closest representative on our site:

www.romi.com

CHAPTER 3

TECHNICAL SPECIFICATIONS

3.1. KEY FEATURES

ROMI DCM620-5X (5 AXIS)

- Machine with moves capacity of 3 linear axes simultaneously;
- Work Rotary table with simultaneous rotation and tilting allowing the machining of parts with complex geometries with high precision;
- B axis with an inclination angle between -110º to + 110º, and c axis with 360 ° rotation;
- Headstock direct drive 15,000 rpm, with thermal insulation, with very low vibration and noise emission resulting in high precision;
- 30 tools (BT/BBT 40) arm-type automatic tool changer.

ROMI DCM 620-5F (5 SIDED)

- Machine with moves capacity of 3 linear axes and 1 of the rotary axes simultaneously (3 + 2);
- Work Rotary table with rotation and tilting moves, enabling the machining of the 5 faces of a part with the same fastening accurately;
- Tilting table (B axis) that supports the rotary table and enable its positioning from -110° up to +110° when Machines equipped with tool preset the angle becomes -50°, and C axis with 360° rotation;
- Spindle cartridge directly coupled to the main motor (direct drive - 10000rpm) with great efficiency in power and torque transmission, with low noise and elimination of gaps and vibrations.

3.1.1. STANDARD MACHINE

ROMI DCM 620-5X V3

. CNC Siemens 828D sl with 19” color screen;
. Headstock with BBT 40 interface;
. Headstock of 19,5 kW (Regime S6 40%);
. Speed range from 0 to 15.000rpm;
. Headstock cooling system;
. Linear guides roller type for X,Y and Z axis;
. 30 tools (BBT 40) arm-type automatic tool changer;
. Electrical installation available for the following voltage/frequencys: 380VCA / 50-60Hz;
. Two rotating axis with directly coupled encoders (B and C);
. Sealed worklight;
. Automatic lubrification system;
. Cutting cooling system with tank (capacity 200L);
. Wash gun;
. Fully hydraulic and pneumatic systems;
. Main, Side and ATC access doors with electrical safety switch;
. Remote Operator Panel with crank functions and JOG to axes X, Y, Z, B and C;
. Set of levelling screws and nuts;
. Set of wrenches for machine operation;
. Set of ROMI product documentation on CD;
. Standard colors: Texturized epoxy enamel Munsell Blue 10B-3/4 and Texturized Epoxy Gray RAL 7035.

ROMI DCM 620-5F V3

. CNC Siemens 828D with 10,4” color screen;
. Headstock with BT/BBT 40 interface;
. Headstock of 18 kW (Regime S6 40%);
. Speed range from 0 to 10.000rpm;
. Linear guides roller type for X,Y and Z axis;
. 30 tools (BT/BBT 40) arm-type automatic tool changer;
. Electrical installation available for the following voltage/frequencys: 380VCA / 50-60Hz;
. Sealed worklight;
. Automatic lubrification system;
. Cutting cooling system with tank (capacity 200L);
. Wash gun;
. Rotary joint for internal cooling;
. Fully hydraulic and pneumatic systems;
. Main, Side and ATC access doors with electrical safety switch;
. Remote Operator Panel with crank functions and JOG to axes X, Y, Z, B and C;
. Set of levelling screws and nuts;
. Set of wrenches for machine operation;
. Set of ROMI product documentation on CD;
. Standard colors: Texturized epoxy enamel Munsell Blue 10B-3/4 and Texturized Epoxy Gray RAL 7035.

3.1.2. Optional Equipment for Machine Configuration

• Longitudinal Hinged belt chip conveyor (TCE) (universal, many types of chips, indicated for short curled chips, usually steel);

• Longitudinal Drag belt chip conveyor (TCA) (for short thin chips, cast iron and non-ferrous - not proper for steel chips or long chips).

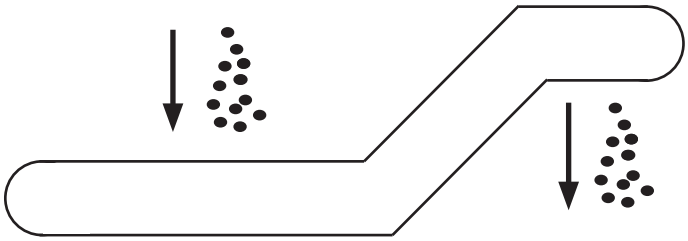
3.1.3. Accessories

• Air conditioning for electrical cabinet;
• Autotransformer - 360 to 480VCA / 50-60Hz (#1);
• Machining area top cover (#2);
• Auto power off;
• Calibration Ball;
• Filter for smoke (generated from the heating of the coolant oil during machining process) (#3);
• Status light indicator;
• Pneumatic chip cleaning system during machining process;
• Measure and inspection of parts;
• Preset of tools system with Renishaw laser;
• Mist exhausting system (#4);
• Sistema de limpeza da base;
• High pressure pump for thru spindle coolant system (7bar) (#5);
• High pressure pump for thru spindle coolant system (20bar) (#6);
• Linear scale for X and Y axis;
• Headstock Cooling System;
• Extended warranty period from 12 to 24 months;
• Extra set of operating, maintenance, programing, instalation and parts manuals on CD;
• Extra set of operating, maintenance, programing, instalation and parts manuals on paper.

(#1) To sell just for voltage different from 380VCA.
(#2) Recommended the sale of the accessory "Mist exhausting system".
(#3) Mandatory the sale of the accessory "Mist exhausting system".
(#4) Mandatory the sale of the accessory "Machining area top cover". The customer should be informed about the increase of the working lay-out.
(#5) Mandatory the sale of the accessory "Machining area top cover". The customer should be informed about the increase of the working lay-out.
(#6) The customer should be informed about the increase of the working lay-out.
Cooling system equipped with backwashing filtering system that dispenses the filtering system role.
Mandatory the sale of the accessory "Machining area top cover".

3.1.4. Application of Optional Components and Accessories

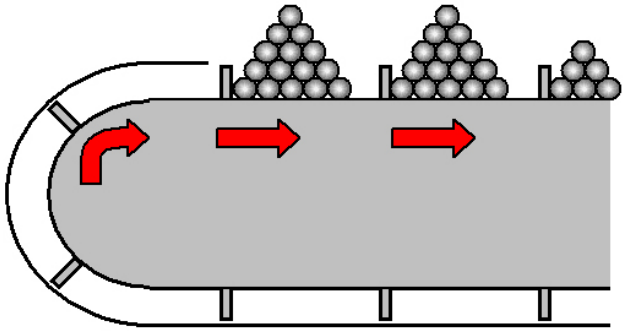
The chip conveyor must be used for the type and load capacity for which were designed. See below the models offered by Romi.



	TCE	TCA
Models available	Chip conveyor with articulated metallic belt	Chip conveyor with drag belt

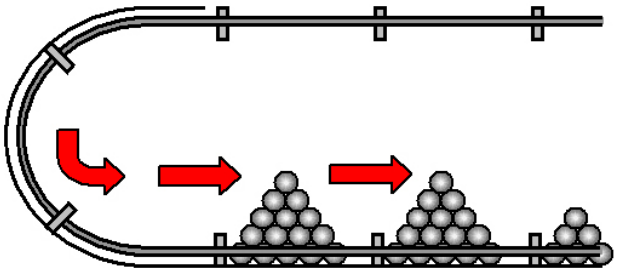
- TCE

Fins fastened on the belt “carry” the chips.



- TCA

Fins fastened laterally in the belt (hollow) “drag” the chips and scrape the conveyor bottom.



UTILIZATION ADVANTAGES

- Remove automatically the volume of chips in the machine, thus preventing interruptions in the machine cycle for removing chips, thus providing higher machine availability. It also prevents the contact of the operator, thus preventing the risk of accidents.
- Eliminates the source of heat inside the machine. (Approximately 90% of the heat generated during machining remains in the chip; this minimizes the influence from heat on the part dimensions and reduces the effect of expansion and contraction.

HOW TO APPLY CORRECTLY EACH MODEL

Model	Característica principal do cavaco	
	Forma	**Material**
TCE	Spiral or long	Usually steels, but there are aluminum types that generate chips in long shapes
TCA	Fine and short	Usually nonferrous materials, such as bronze and brass, but there are cases with aluminum and cast iron (10% of applications)

IMPORTANT NOTES:

There are cases in which the customer generates chips of several material types. In this situation, TCE is the most indicated solution, since it is also capable of carrying fine and broken chips, but the customer must clean the conveyor more frequently, because the TCE efficiency is reduced when it carries fine and broken chips.

In addition to carry fine chips, the TCA is capable of carrying broken chips, but the customer is also required to clean the conveyor more frequently, because the TCA efficiency is reduced when it carries broken chips. This model does not carry long chips.

3.2. TECHNICAL SPECIFICATIONS

Description	Unit	Specifications	
		DCM 620-5X	DCM 620-5F
Vertical headstock			
Spindle taper	ISO	40	
Speed ranges (RPM)	rpm	15.000	10.000
Feeds			
Rapid traverse (X / Y / Z axes)	m/min	36	
Maximum rotation (B and C axes)	rpm	12	
Max. programmable cutting feed	mm/min	1 - 20	
Travels			
X axis travel	mm	620	
Y axis travel	mm	520	
Z axis travel	mm	460	
Rotation angle - B axis	-	-110º ~ + 110º	
Rotation angle - C axis	-	360º	
Rotary table			
Table surface	mm	600 x 600	
Max. piece dimension on table	kg	300	
Number of T-slots and T-slot width x distance	-	5 x 100 x 18	
Spindle			
Rotation	rpm	10.000	
Motor	-	1PH8107-1VG02-3LC1	
Main motor AC (continuous rating)	kW	13	12
Automatic tool changer			
Tool holder type	-	BBT 40	
Tool capacity	un	30	
Tool max. diameter (without adjacent tool)	mm	Ø 76 (Ø 127)	
Tool max. length	mm	250	
Maximum tool weight	kgf	7	
Maximum weight in Magazine	kgf	120	
E.E. Data			
Main Motor power CA (S1 / S6)	kW	13 / 19,5	12/18
Total installed power	KVA	50	
CNC Model	-	Siemens 828D sl	Siemens 828D
Dimensions and machine weight (approximate)			
Floor space required (front x side x height)	mm	4440 x 3583 x 2411	4334 x 3477 x 2411
Net weight	kg	9200	

Technical specifications are subject to changes without prior notice

CHAPTER 4

SAFETY

The following warning and safety measures help to prevent damages to life and health of users or maintenance personnel, as well as to prevent material damages.
Label Meanings:

**This symbol means “GENERAL DANGER”.
Failure in preventing the danger may cause severe personal injuries, death or serious material damages.**

**This symbol means “GENERAL MANDATORY ACTION”, which must be performed.
Failure in performing the action may cause personal or material accidents.**

**This symbol means “GENERAL PROHIBITION”.
Performing the action may cause severe personal injuries, death or serious material damages.**

4.1. POTENTIAL MACHINE HAZARDS

This product has been developed, manufactured, tested and its documentation compiled in compliance with the current state-of-the-art, by maintaining the relevant safety standards.

WARNING
Consequences when the machine is improperly used:

- Risk to life or body limbs of the user or other people.
- Material damages on the machines or other assets.

See danger notes in this manual.

The machine is fitted with several operator safety devices. Never disable or tamper with any of these devices. Failure in observing this instruction may result in serious body injuries and harm to human life.

4.2. PROPER UTILIZATION

The machine exclusively serves for turning in CNC with chip removal.
The machine must not be used for other types of services and their use must comply with its features and capabilities.

WARNING
Improper handling of the machine may cause severe physical injuries or significant material damages.

The machine must be used only
- For its own purposes.
- In perfect conditions, according to the safety rules.

When the machine is used for other applications, but the ones mentioned above, or when changes that affect safety are performed on the machine, the manufacturer or vendor will not be responsible for personal accidents and material damages or consequent damages.
For machine operation and maintenance, the instructions contained in the Manuals must be strictly observed.

4.3. SHUTDOWN, REMOVAL AND SCRAPING

Under normal work conditions and given all the observations of use, maintenance and conservation contained in the Product's Technical Documentation , the useful life of the machine will be deemed undetermined.
If the machine or equipment is not under safe operating conditions due to excessive or natural wear and tear, its disposal should be in accordance with effective local regulations.

4.4. OPERATOR RESPONSIBILITIES

The operator binds himself to permit working in the machine only personnel:

- familiarized with the basic rules on industrial safety, prevention of accidents, and trained on the machine operation.
- who have read and understood the chapter about safety and the warning notes in this Manual, by confirming this with their signature.

Periodical checks will be performed on the compliance of the work with the safety rules.

4.5. PERSONNEL RESPONSIBILITIES

All the people authorized to work with the machine bind themselves to:

- observe the basic rules on industrial safety and prevention of accidents.
- read the chapter on safety and warnings included in this Manual, before starting the work.

4.6. MACHINE COMMAND

- Never make changes in the software.
- Only trained personnel is permitted to operate the command.

4.7. DANGER POSED BY THE ACCESSORIES

Only use parts, tools and accessories that have been approved by the machine manufacturer. **The manufacturer or vendor is not responsible** by non-approved products from other manufacturers, or changes made on the accessories.

CAUTION

Improper handling of accessories may cause body injuries, as well as material damages on the machine.
The maximum values of the machine, as well as warnings on handling, included in manuals and charts, must be observed.

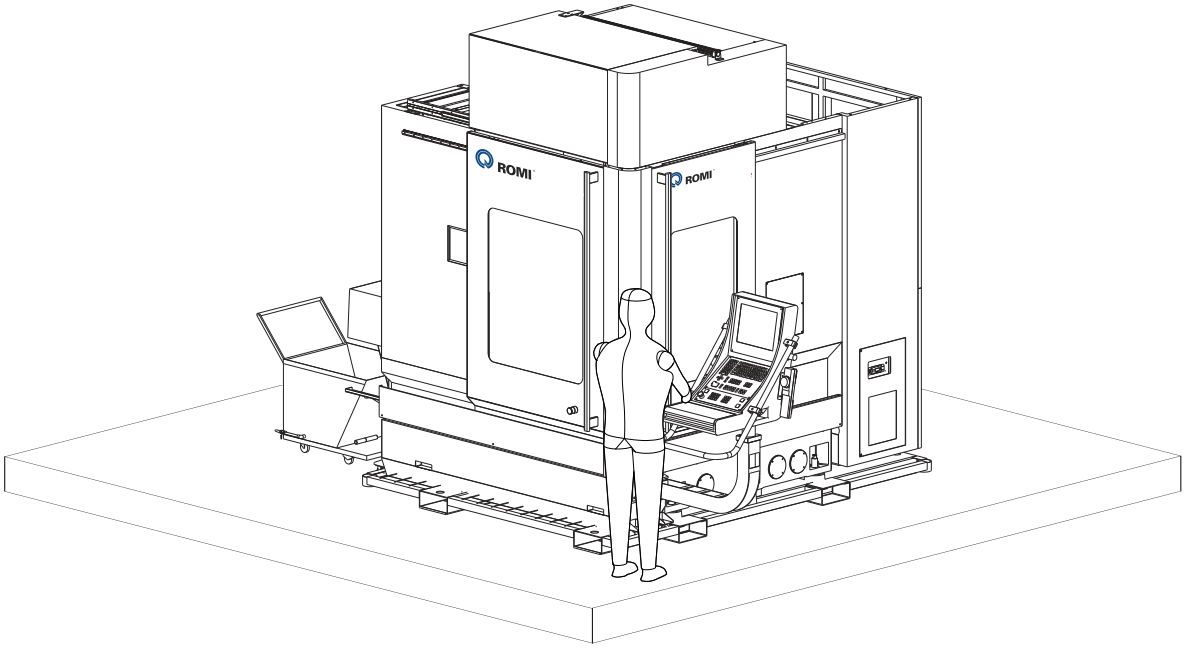
4.8. DETAILS ON PERSONNEL QUALIFICATION

- The Machining Center must only be operated by trained personnel.
- The minimum age limit must be observed.
- People attending general training (training course, instructions, etc.) must be under permanent supervision of a qualified professional.
- The responsibilities of the trainee group must be clearly expressed (transportation, inspection, operation/handling and maintenance).
- Operators should be properly trained in the safe use, settings and machine operation.

4.9. SAFETY PRECAUTIONS AT THE INSTALLATION SITE

- The work area in front of the machine must be easily accessed.
- The work area must provide good lighting conditions.
- All the doors and covers must be completely accessible.
- The operator's work area in front of the machine must not be slippery.
- The floor must be kept clean and dry to prevent accidents.
- A mat or any other antislip material cover must be used at the operator's area.
  a) kept clean and free of objects, tools and any material that may create an accident risk;
  b) have features to prevent risks caused by grease, oils and other substances and materials that make them slippery; and
  c) be flat and resistant to the loads to which they are subjected.

A mat or any other antislip material may be used at the operator's work area.



IMPORTANT

For machine models where there are work sites above the ground level with worker access to operation or any other usual intervention (supply, maintenance, preparation and inspection), mobile platforms or lift gates must be provided. In case of doubts, contact Romi.

Where applicable, footbridges, platforms, ramps and ladders should provide safe conditions for working and circulation, and above all, they must be kept free.

4.10. PROCEDURE IN CASE OF EMERGENCY

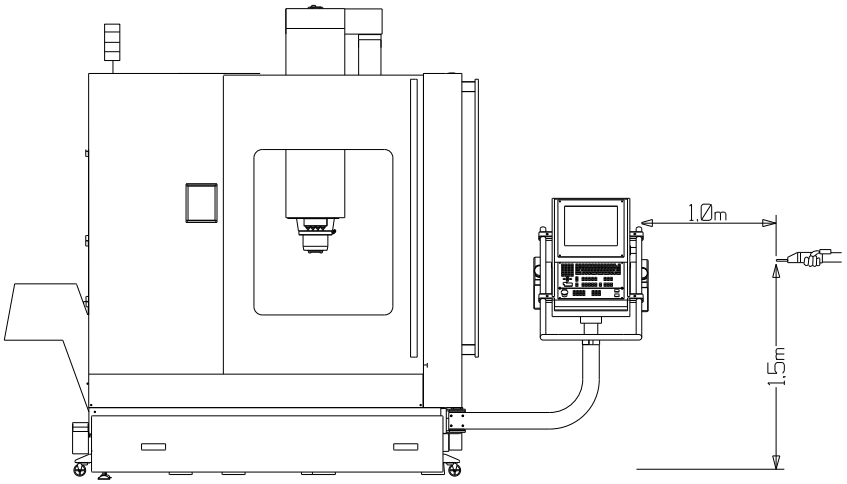
In case of emergency, press the EMERGENCY BUTTON on the command panel.
This interrupts all the machine motions.
Look immediately for First Aid in case of any injury.

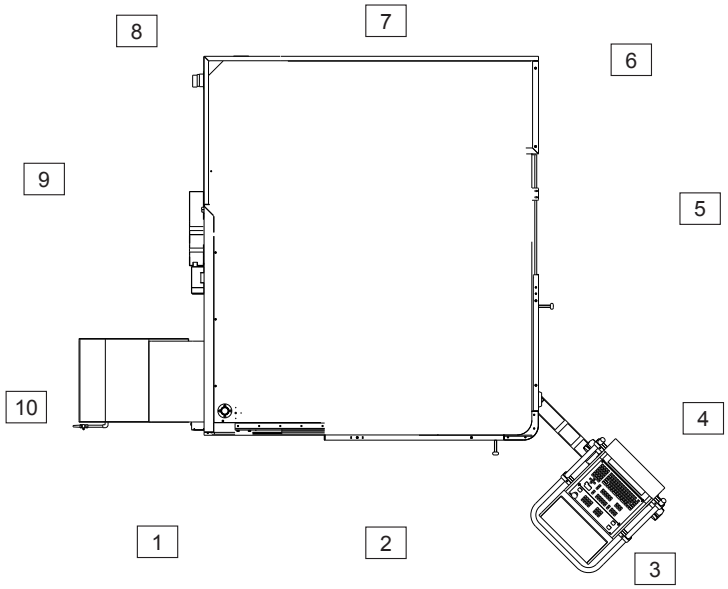
4.11. EMISSIONS

4.11.1. Noise

The level of noise during machine operation depends on several factors; these include the tool status and its holder, the fixation device (ex.: board) and maintenance of the machine's moving parts.
Measured according to ISO 3746.
Measurement conditions:

- The machine is ready to operate. Guards are closed.
- The motor operates at its highest speed (rpm).
- The distance between the measuring instrument and the machine is 1m.
- Measuring is made at points 1 to 10
  Measuring instrument: Brüel & Kjae Controller type 2237 - Integrated Noise Level Meter
- Procedure:





Measuring Points		1	2	3	4	5	6	7	8	9	10
Spinle Max. Rotaation (rpm)	Medium Noise Level Fixed at dB (A)	*									
Spindle Rotation Critical (rpm)		-									
Environmental Noise Level		*									
* Permissible Noise Level < 85dB (A)											

4.12. GENERAL SAFETY WARNINGS

1. All the activities required must be performed only by qualified people. The safety procedures and warnings included in this manual must be observed.

2. The emergency button location must be well known so it can be pressed at anytime.

3. Never issue a command when you are not aware on its results. Before activating any manual command, be sure to use the correct one.

4. Never operate the machine without guards / side doors.

5. Protections surrounding the machine are designed to minimize the risk of ejection, but not to eliminate them completely. To reduce the chances of danger, all maintenance and care referred to in this manual regarding protections and the display must be rigorously implemented

6. A defective or old protective display does not provide enough protection in case of ejection of pieces or work piece parts, tools or other objects that may be thrown out of the work area of the machine in the event of a malfunction. With the display in one of these situations, it should be replaced. The consequences may be serious injury, death or material damages.

7. Do not carry out any manual operation while the machine is running.

8. The access to the electrical panel, control panel and transformer compartment is permitted only for qualified maintenance technicians. Some points within these areas may contain high voltage terminals. When touched, these points may cause hazardous electric shocks, or even death.

9. In case of power outage, turns MASTER SWITCH off immediately.

10. Before performing any maintenance work, turn the machine's master switch off and lock it with a padlock.

11. Only use oils recommended in the Maintenance Manual.

12. Electronic parameters and adjustments should not be changed without authorization, and must be handled only by qualified technicians. In case that changes on parameters or electrical adjustments are required, write down the original value, so to enable reenter them when required.

4.13. WARNINGS BEFORE SWITCHING THE MACHINE ON

1. Before operating check the conditions of safety devices.
2. Use personal protective equipment.
   Wear safety footwear, safety goggles and gloves to handle machined pieces.
   Hooks must be used to remove chips.

3. Be sure that all guards and safety gates are closed and functional.

4. Do not leave electrical cables on the floor.

5. If the machine remains inactive for some days it is necessary to manually actuate the lubrication system.

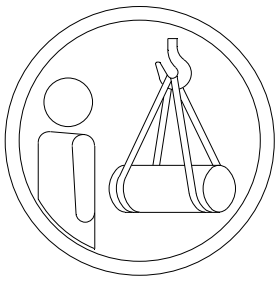
6. Before starting to operate the machine, check the oil level in the lubrication tank. Complete with the correct oil if necessary.
7. Before starting to operate the machine, check the coolant oil level and quality. If necessary, change the oil or complete the level.

8. If the machine is used with flammable cutting fluids or pyrophoric materials, additional safety measures should be used. Check the local safety rules.

9. Never extend bars out (behind) the spindle or actuator cylinder.

IMPORTANT

For handling heavy parts or components, with special geometry, use suitable safety devices for lifting and transportation. The failure in meeting this recommendation may cause serious accidents, death or material damages.



IMPORTANT

To start the machine, turn on first the plant power switch, then turn on the machine's main switch, in this order.
After turning the main switch on, turn on the CNC and wait for the image display on the screen.

4.14. WARNINGS ON ROUTINE INSPECTION

1. After switching the machine on, you must check the pressure levels indicated by the manometers for ensuring that the chuck, tailstock and other components are working properly.
2. On a daily basis and whenever necessary, remove chips from the machining area.
3. Clean the coolant tank fi lters on a daily basis.
4. For machines equipped with pneumatic panel, it is necessary to check the system air pressure on a daily basis, and check the fi lters and lubricant oil level on a weekly basis.
5. Inspect all chip wipers and protections on a weekly basis, checking for possible damages.

   Replace them if necessary.
6. The operator must pay attention to strange noises originating from the spindle-shaft, main motor, servo-motors, ball spindles, etc...

   If any strange noises would come out from any part of the machine, report to the maintenance department responsible for the machine or to Romi technical assistance.

4.15. MACHINE PREHEATING

Before starting the operation, it is recommended to heat the machine from 10 to 20 minutes. Run a part program that operates the arbor shaft at half-speed, move X-, Y- and Z-axes slowly and operate all the machine components.

4.16. WARNINGS FOR THE MACHINE SETTINGS

1. All machine tools and pieces to be machined shall be compatible with the machine specifications and capabilities.

2. Never use rotation above the maximum speed allowable for boards and do not machine unbalanced devices and parts that may pose risks to the operator.
3. Do not make any changes in the device used to set parts (ex.: boards) provided with the machine. Any changes may limit the maximum admissible rotation in the spindle, reducing the efficiency of device fixation, therefore reducing the safety of the equipment;

4. Never use worn-out tools. This could cause serious damages to the pieces and would reduce the machine efficiency.

5. Keep all tools, accessories, devices and any other equipment away from the machine. Do not place tools or other devices on the machine.

6. After installing a tool, it is necessary to test it.
7. After machining the soft jaws, it is necessary to check whether they are properly securing the pieces to be machined.

4.17. SAFETY PROCEDURES FOR OPERATORS DURING THE MACHINE OPERATION

1. The operator may not wear long or loose hair.
Long hair could entangle into moving parts causing serious accidents.

2. Do not operate manual controls (buttons, keys, etc...) wearing gloves.
3. Whenever a heavy part is to be installed to or removed form the machine it is necessary to use suitable lifting and transportation devices.

4. Do not touch parts, chips or the tip of tools with bare hands. These materials may be at high temperatures.

5. Prior to adjusting a coolant fluid outlet nipple of a tool-holder or during tool changes the machine must be fully stopped.

6. Never touch a piece or other spindle device with your hand while they are rotating.
7. Never touch moving parts while they are running.

8. Be careful with certain substances used in the process, such as aluminum or magnesium, which may cause additional hazards, such as fires and explosion or particulate emission that are harmful to the health of the operator.

9. You should always comply with the effective laws and regulations in order to identify and control materials that may cause risk to the operator's health during machining.

4.18. PROCEDURES TO INTERRUPT THE MACHINING OPERATION

1. Press the CYCLE STOP key (interrupts motion of X-, Y- and Z-axis).
2. Press RESET key.
3. Press EMERGENCY button to stop the machine during machining (only when required)

4.19. WARNINGS AFTER FINISHING A WORK

1. After finishing a work, the chips must be removed from the machine and all the guards must be cleaned.
2. Never clean the machine before stop it completely.
3. When the machine is stopped during a long period, it is necessary to press the Emergency Button, turn the Main Switch off, and turn the plant's Power Switch off.

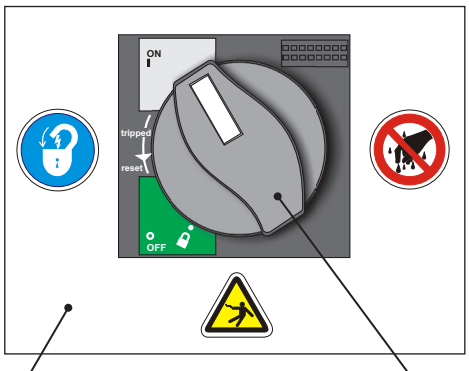
4.20. WARNING ABOUT THE MAINTENANCE OPERATION

1. All maintenance procedures should be subject to planning and management carried out by a legally qualified professional.
2. The replacement of components or software that affects the safety of the machine should be performed only by qualified and authorized personnel with instructions given by the manufacturer.

IMPORTANT

Prior to perform any maintenance work, turn the machine off by the main switch and lock it with a padlock to avoid severe accidents or material damages.

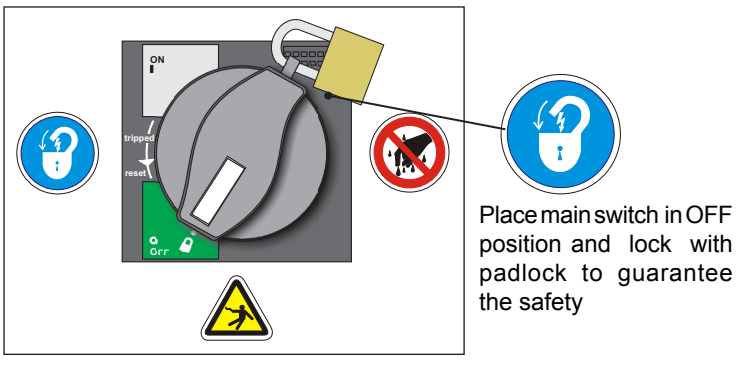
Powered Machine



Door Panel electric

Switch General

Machine switched off for maintenance activities



Place main switch in OFF position and lock with padlock to guarantee the safety

4.21. SAFETY PROCEDURES AFTER MAINTENANCE AND UNTIL THE MACHINE OPERATION

1. Never operate the machine without guards.
   All the metal guards removed must be reinstalled.

2. Parts and other components changed during the maintenance work must be removed from the machine area for operator's safety.

3. The machine must be tested to assure safe operation.

4. It is recommended to log all the preventive and corrective maintenance works and keep all the log records archived.

4.22. WARNINGS ON CAUTIONS AND CLEANING

When the machine is operating in extended machining operations with bronze, brass, aluminum, cast iron or similar alloys, take greater caution with the guards, chip wipers and cut cooling oil reservoir. To do that, observe the instructions below:

GUARDS
Clean the guards at every 4 hours by using a vacuum cleaner.

CHIP WIPERS
These must be inspected at every 100 hours, and in case of wear, they must be replaced.

CUT COOLING OIL RESERVOIR
Filters must be cleaned at every 4 operating hours and the reservoir must be cleaned after 200 hours, or as required.

4.23. WARNINGS ON ENVIRONMENT

Never place chips, cut cooling oil and hydraulic oil in improper places.
The collection of chips, cooling oil and hydraulic oil must be made by trained personnel and according to the legal procedures indicated by the environmental laws in force.

4.24. SAFETY SIGNS

4.24.1. Danger

General

High Voltage

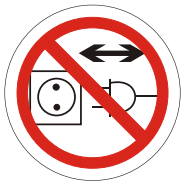
Electric Shock

4.24.2. Warning

Access forbidden for non-authorized persons

Do not operate the machine without guards

Never touch with wet hands


Do not connect or disconnect plug from outlet with the machine operating

4.24.3. Actions

General

Power Supply Disconnection

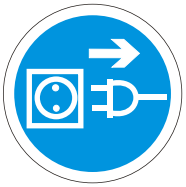
Use Safety Gloves

Refer to the Maintenance Manual

Refer to the Operation Manual

Forklift Point

Forklift Point


Electrical connection

4.24.4. Machine Instructions, Indications and Data

⚠ WARNING!

1- Study the operation and maintenance manuals, read and understand all warnings on the machine before turning the machine on. neglecting to follow these instructions and warnings can lead to personal injury and damage to the equipment.

2- This machine starts and moves automatically. never put any parts of your body or clothing near or over any moving parts.

3- Always let the machine and spindle come to a complete stop before touching work pieces, tools, spindle or any other moving part of the machine.

4- Do not operate the machine before making sure that all machine guards, interlocks and other safety devices are installed and operating properly.

5- Be certain that the work piece and tools are securely positioned. avoid excessive feedrates and rotational speeds.

6- Remove ring, jewelry, watches and loose clothing before operating the machine. Keep hair away from moving parts.

7- Always wear safety glasses and safety shoes when operating the machine, wear earplugs if required due to the machining being done on the machine.

8- Service or installation of the machine must be performed by qualified personnel only, and according to the procedures described in the maintenance and other manuals for the machine. Before performing any maintenance, turn the electrical disconnect switch off and lock it.

It is the responsability of the user to make sure that the machine is in perfect operating condition and that all operating and maintenance procedures described in the manuals as well as all warnings on the machine are followed. If you have any questions about the operation or maintenance of the machine, see your supervisor or contact romi representative.

Do not remove or destroy this machine plate.

⚠ WARNING!

1- Selection and maintenance of coolant fluids very important to avoid damage to machine paint, rubber seals and electriccables.

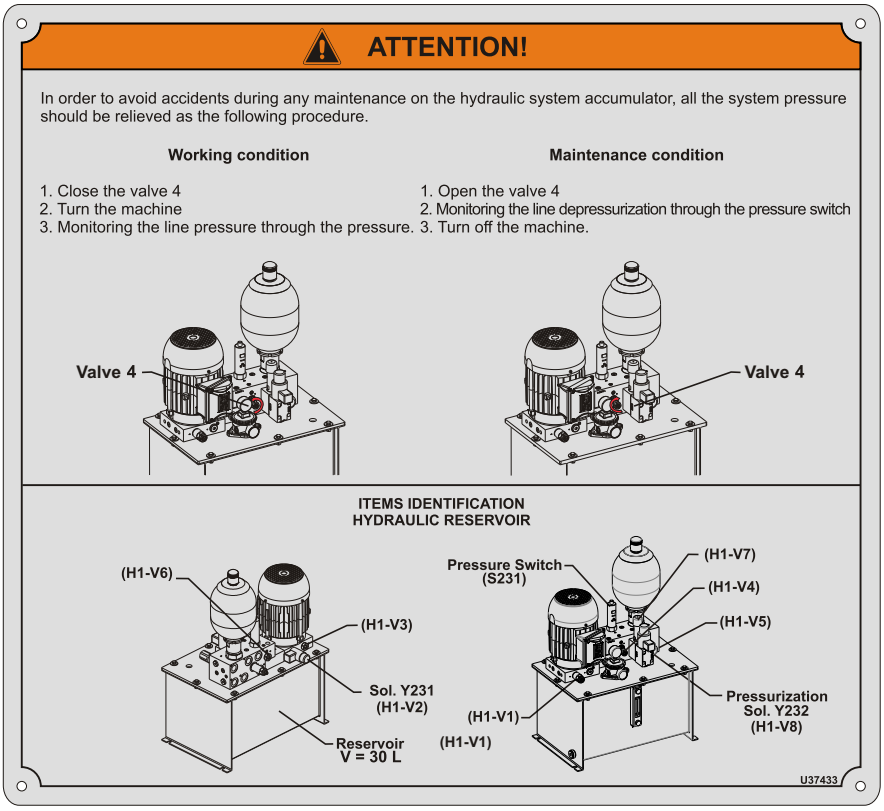
2- Regular cleaning of machine parts such as safety guards, guideways, coolant tank, etc. Is essential for proper machine operation.

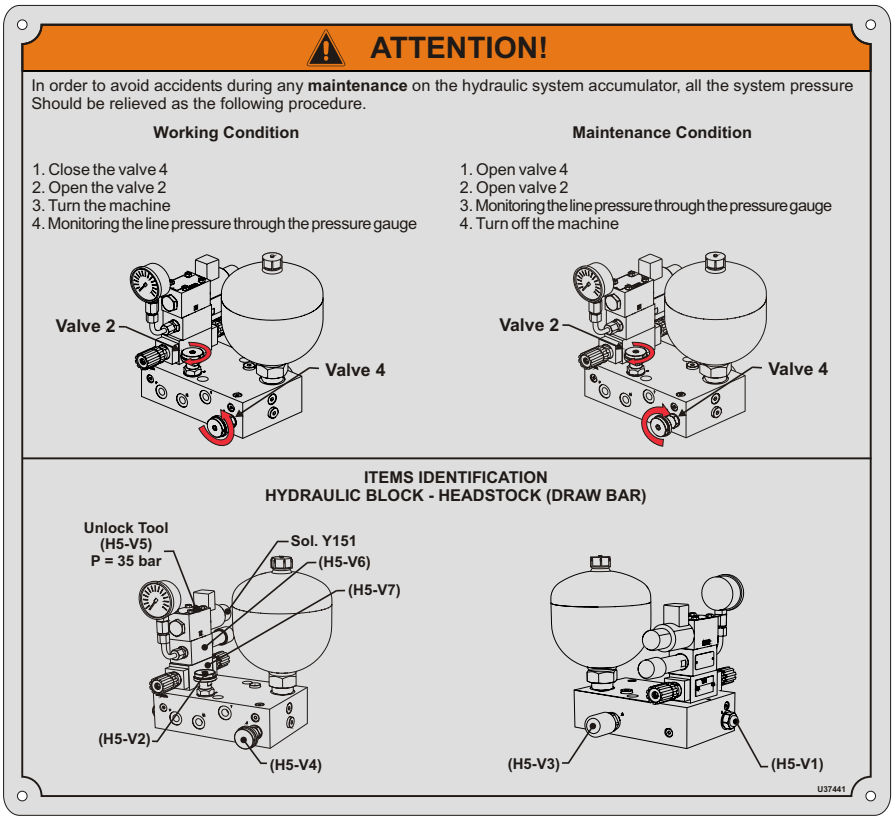
Refer to maintenance manual.

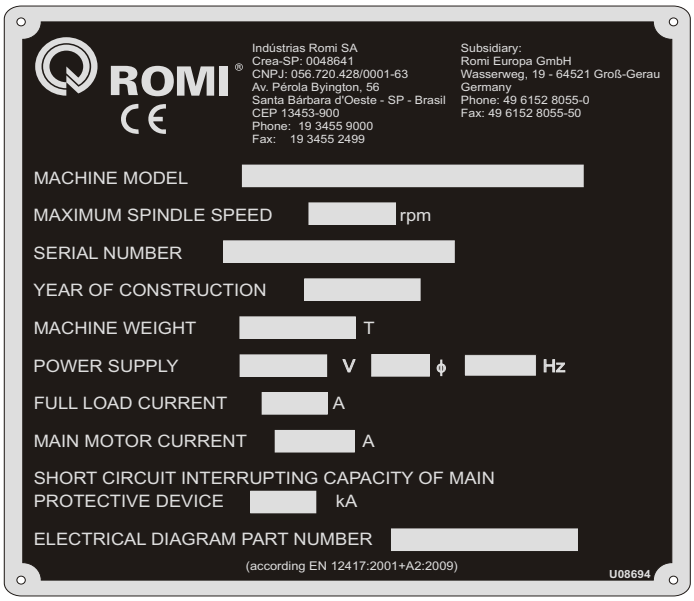
During handling, removal and destination of residues from equipment operation and maintenance, preserve the environment according to the local legal requirements.

ECO ISO 14001

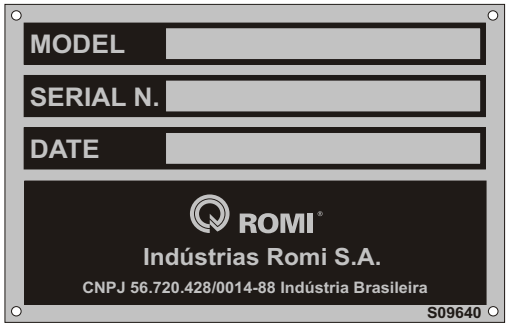
U06164


ATTENTION!
In order to avoid accidents during any maintenance on the hydraulic system accumulator, all the system pressure should be relieved as the following procedure.
Working condition
1. Close the valve 4
2. Turn the machine
3. Monitoring the line pressure through the pressure.
Maintenance condition
1. Open the valve 4
2. Monitoring the line depressurization through the pressure switch
3. Turn off the machine.
Valve 4
Valve 4
ITEMS IDENTIFICATION
HYDRAULIC RESERVOIR
(H1-V6)
(H1-V3)
Sol. Y231
(H1-V2)
Reservoir
V = 30 L
Pressure Switch
(S231)
(H1-V7)
(H1-V4)
(H1-V5)
Pressurization
Sol. Y232
(H1-V8)
(H1-V1)
(H1-V1)
U37433


ATTENTION!
In order to avoid accidents during any maintenance on the hydraulic system accumulator, all the system pressure Should be relieved as the following procedure.
Working Condition
1. Close the valve 4
2. Open the valve 2
3. Turn the machine
4. Monitoring the line pressure through the pressure gauge
Maintenance Condition
1. Open valve 4
2. Open valve 2
3. Monitoring the line pressure through the pressure gauge
4. Turn off the machine
Valve 2
Valve 4
Valve 2
Valve 4
ITEMS IDENTIFICATION
HYDRAULIC BLOCK - HEADSTOCK (DRAW BAR)
Unlock Tool
(H5-V5)
P = 35 bar
Sol. Y151
(H5-V6)
(H5-V7)
(H5-V2)
(H5-V4)
(H5-V3)
(H5-V1)
U37441

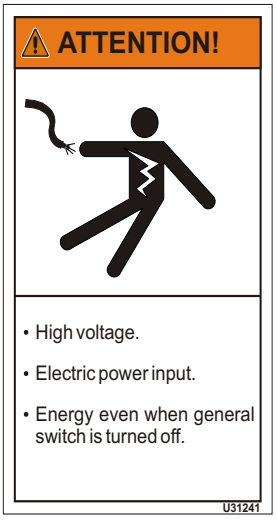


General Data



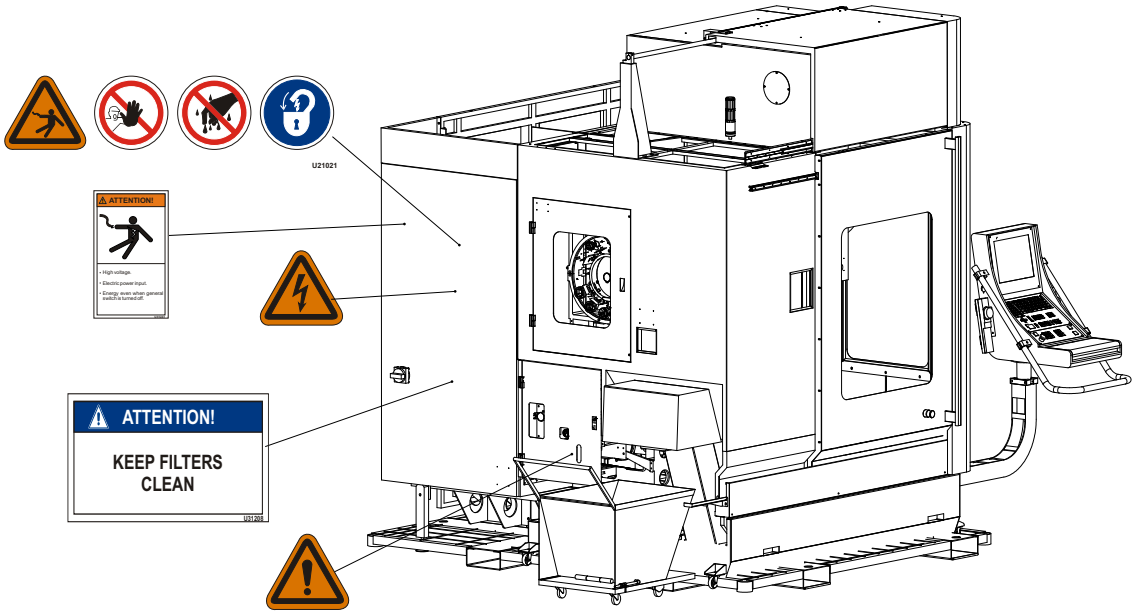
Machine Identification

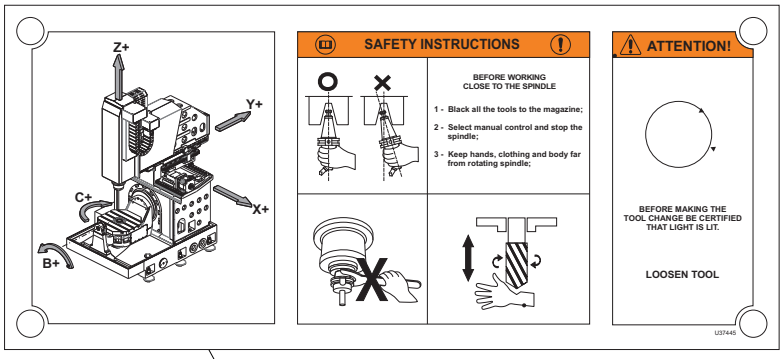
Filter Maintenance

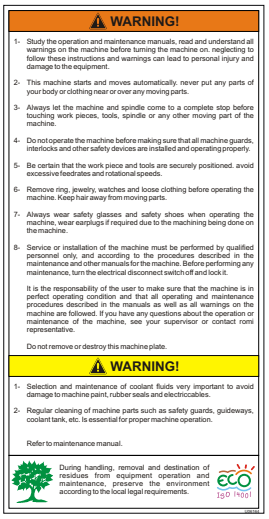


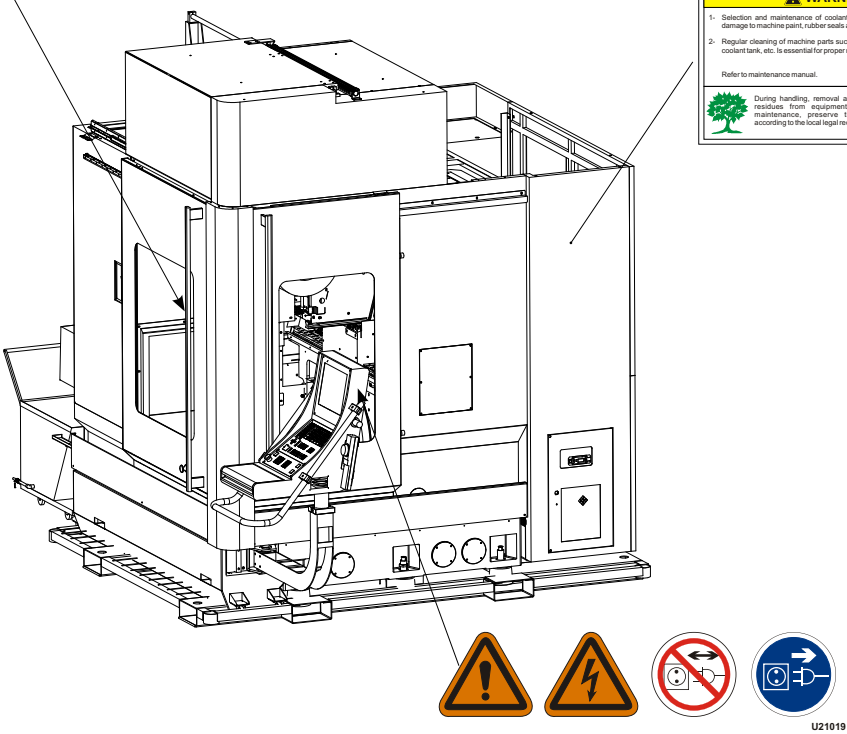
Voltage Security

4.25. LOCATION OF SAFETY LABELS




Z+
Y+
C+
X+
B+
SAFETY INSTRUCTIONS
BEFORE WORKING CLOSE TO THE SPINDLE
1 - Black all the tools to the magazine;
2 - Select manual control and stop the spindle;
3 - Keep hands, clothing and body far from rotating spindle;
ATTENTION!
BEFORE MAKING THE TOOL CHANGE BE CERTIFIED THAT LIGHT IS LIT.
LOOSEN TOOL
U37445


WARNING!
1- Study the operation and maintenance manuals, read and understand all warnings on the machine before turning the machine on. neglecting to follow these instructions and warnings can lead to personal injury and damage to the equipment.
2- This machine starts and moves automatically. never put any parts of your body or clothing near or over any moving parts.
3- Always let the machine and spindle come to a complete stop before touching work pieces, tools, spindle or any other moving part of the machine.
4- Do not operate the machine before making sure that all machine guards, interlocks and other safety devices are installed and operating properly.
5- Be certain that the work piece and tools are securely positioned. avoid excessive feedrates and rotational speeds.
6- Remove ring, jewelry, watches and loose clothing before operating the machine. Keep hair away from moving parts.
7- Always wear safety glasses and safety shoes when operating the machine, wear earplugs if required due to the machining being done on the machine.
8- Service or installation of the machine must be performed by qualified personnel only, and according to the procedures described in the maintenance and other manuals for the machine. Before performing any maintenance, turn the electrical disconnect switch off and lock it.
It is the responsability of the user to make sure that the machine is in perfect operating condition and that all operating and maintenance procedures described in the manuals as well as all warnings on the machine are followed. If you have any questions about the operation or maintenance of the machine, see your supervisor or contact romi representative.
Do not remove or destroy this machine plate.
WARNING!
1- Selection and maintenance of coolant fluids very important to avoid damage to machine paint, rubber seals and electriccables.
2- Regular cleaning of machine parts such as safety guards, guideways, coolant tank, etc. Is essential for proper machine operation.
Refer to maintenance manual.
During handling, removal and destination of residues from equipment operation and maintenance, preserve the environment according to the local legal requirements.
eco
ISO 14001



CHAPTER 5

MACHINE TRANSPORTATION AND INSTALLATION

5.1. LIFTING AND TRANSPORTATION

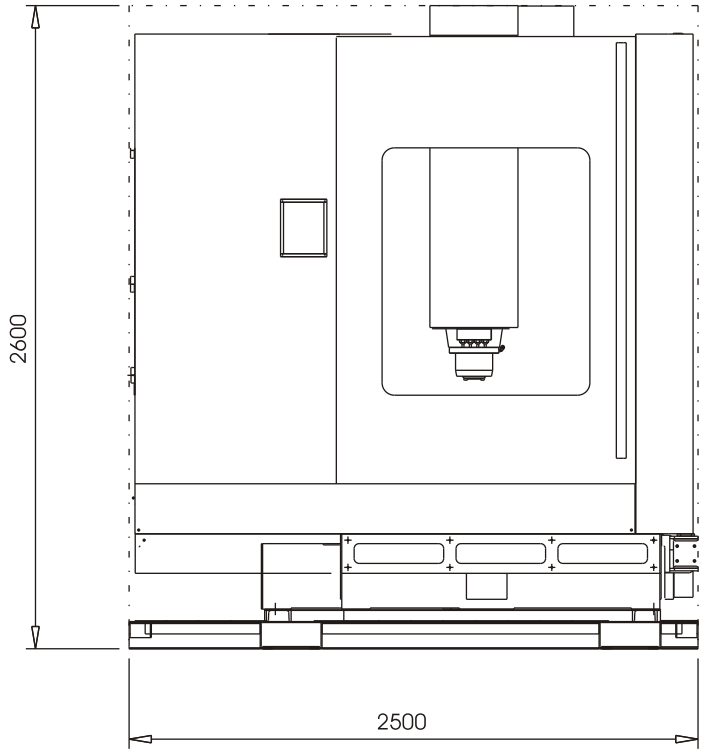
5.1.1. Machine

When transporting the machine to the installation site, no collisions must occur between its components or between the machine and other equipment.
In addition to machine damages, collisions may cause misalignment of its precision components.
For lifting and transportation, the machine must be totally balanced and locked.

Approximate Weights

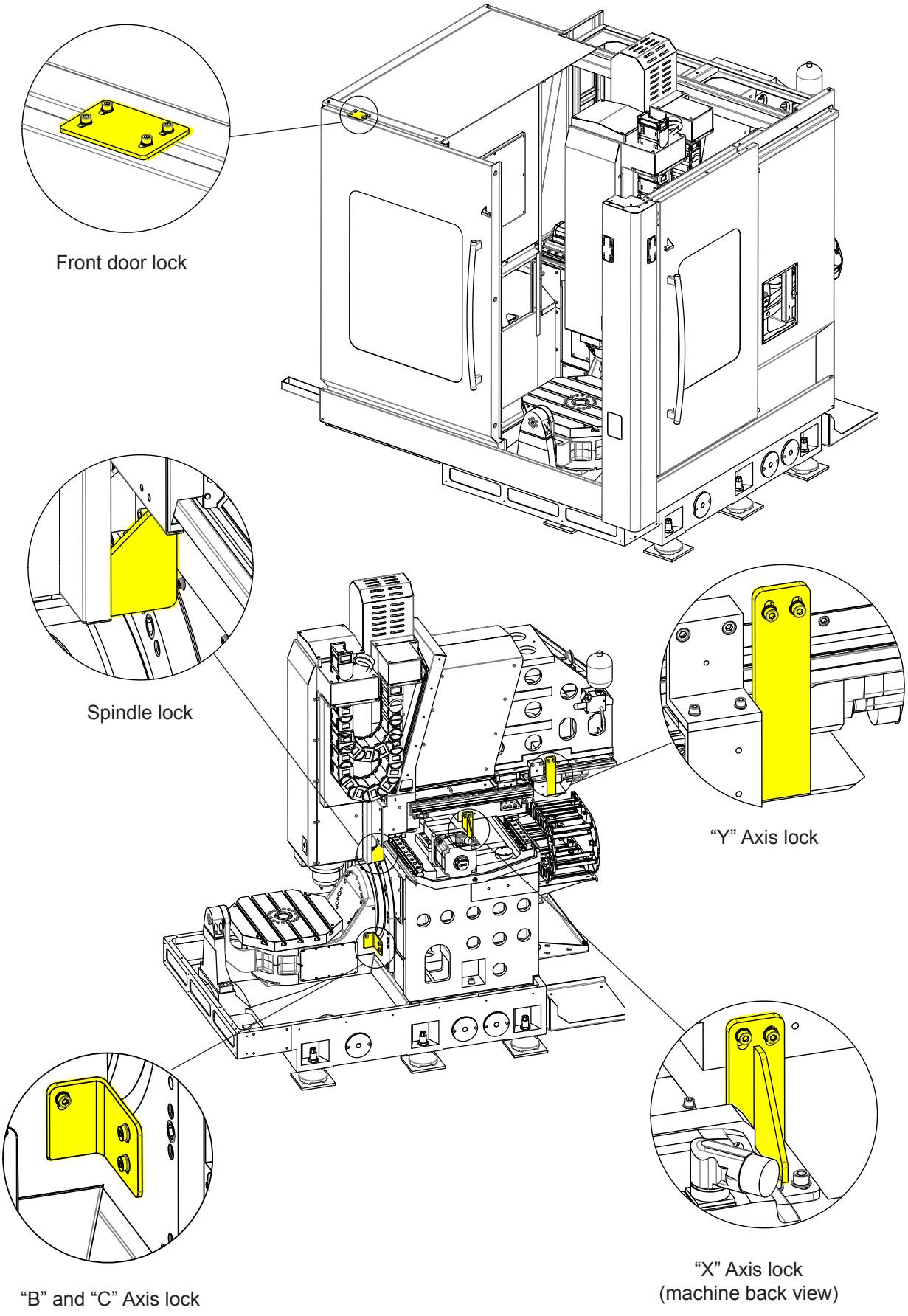
Machine	9.200 kgf

- The user and/or installation personnel must meet the national requirements for machine lifting devices.



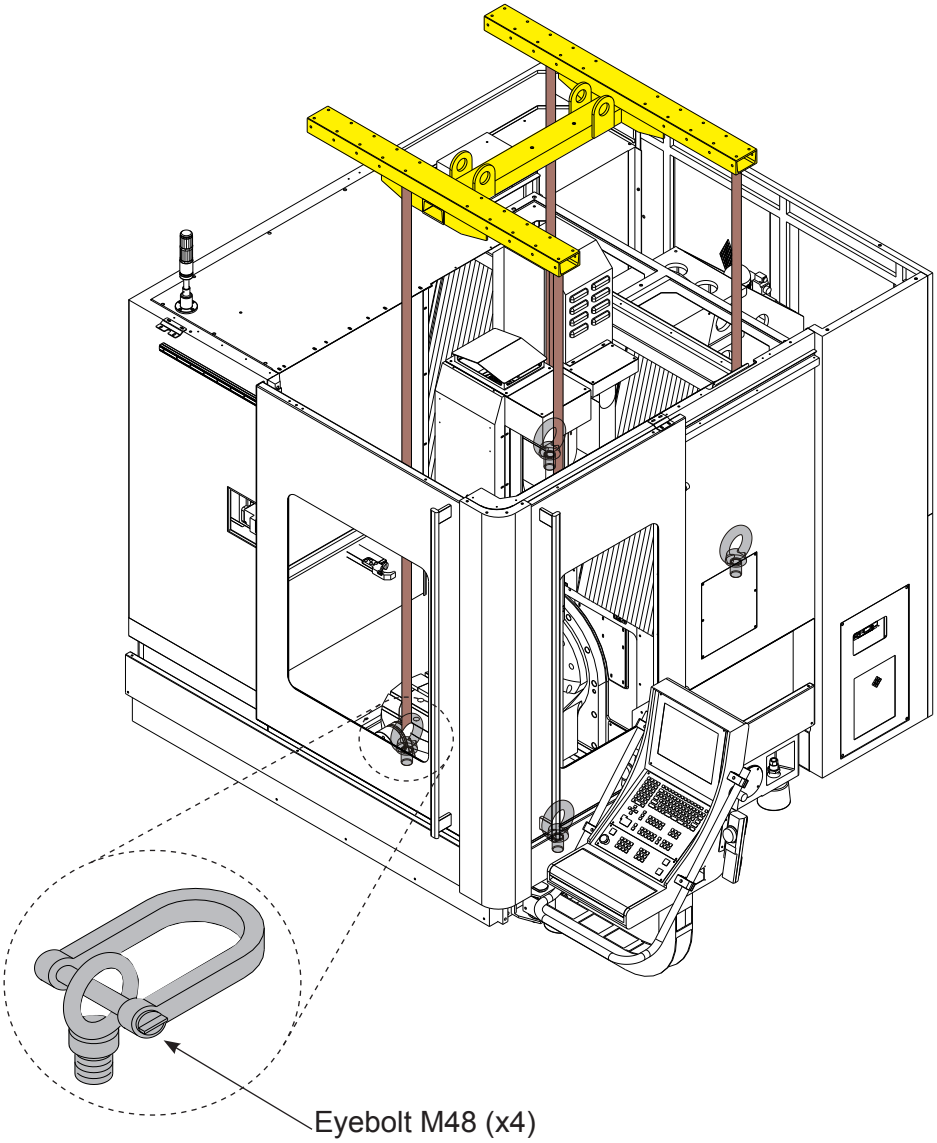
Minimum box dimensions to the transportation in container option.

Location of Lock Devices Used for Transportation



Lifting Device

Whenever the machine transportation is required by lifting, the indicated points for fixing the eyebolts must be used, as well as the technical specifications required for proper and safe transportation, as illustrated in the figure below:



Eyebolt M48 (x4)
Supported load in each eyebolt: 32.000 kg

WARNING

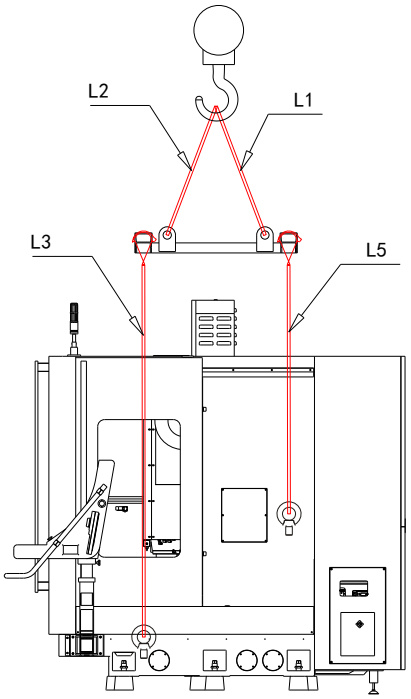
For lifting is required the use of eyebolts the indicated positions otherwise could result in serious personal injury and / or property. These eyebolts are supplied with the machine and must be kept in a safe place, forecasting future use.

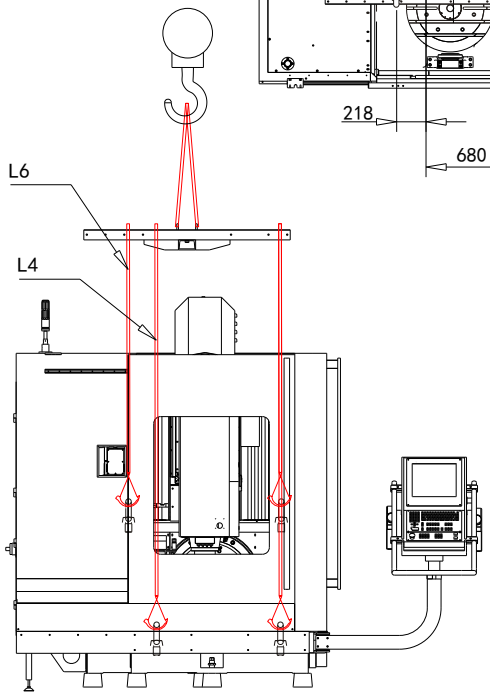
The care of this material is entirely responsibility of the machine proprietary.

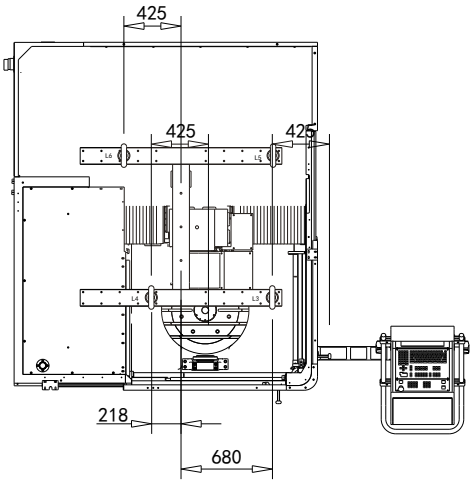
L1=L2=2000mm

L3=L4=3000mm

L5=L6=2100mm

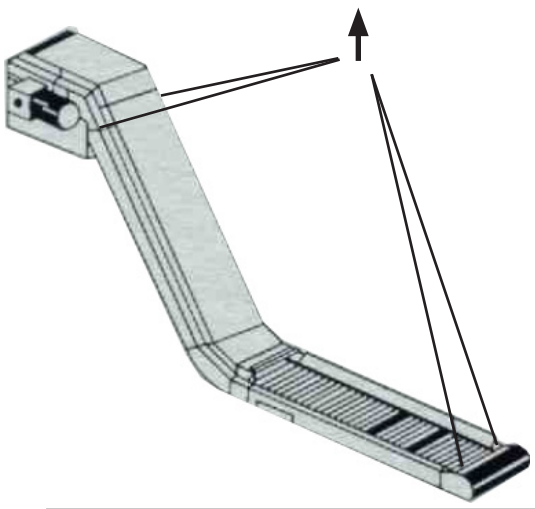






5.1.2. Chip Conveyor

For lifting and transportation use the lifting eyebolts (4x), as illustrated in the figure beside.



Transportation with forklift must be performed only in the original cradle and taking utmost care.

Chip Conveyor Total Weight
300 kg

DANGER

Machine and equipment must be transported only by qualified personnel.
Machine and equipment may drops. This will result in death or serious physical injuries as well as considerable material damages.

5.2. INSTALLATION SITE REQUIREMENTS

The floor must provide load capacity sufficiently safe to support the machine weight and must be perfectly leveled.
The electrical panel and all the machine components must be easy accessed, thus enabling freedom of movement for operators and maintenance personnel.
The installation site must provide good lighting conditions.

Note: For machines equipped with Remote Diagnosis Interface, the customer must provide, close to the machine (up to 25 meters), one **direct dialing** telephone line **(valid for "direct inward dialing system")**. When the machine is not being monitored, this line may be used for other functions.

5.3. RECOMMENDED INSTALLATION AND OPERATION CONDITIONS

- Ambient temperature: Minimum: 10 ºC (50ºF)
  Maximum: 40 ºC (104°F)
- Maximum relative humidity: ≤90% / 1000m, no condensation

IMPORTANT

- Do not install the machine at places where it is exposed to sunrays, close to heat sources or subject to excessive temperature variation.

- When the machine must be installed close to vibration-generation equipment, the foundation must provide insulation material, or any other method must be used to protect the machine.
  Do not install the machine at places subject to excessive vibration.

- Do not install the machine at places subject to dust or corrosive gases and acids, harmful to the machine.

5.4. ELECTRICAL INSTALLATION REQUIREMENTS

Power supply at the installation site must provide enough capacity to meet the electrical installation requirements of the machine. Make sure that the power supply to the machine is properly installed. In both cases, the power conditions must comply with local regulations. The failure in compliance may cause machine malfunctioning.

5.4.1. Wiring

Always refer to the Electrical Diagram, when the electrical installation of the machine is made for the first time, in “DATA FOR THE CUSTOMER’S BRANCH INPUT LINE”
Make sure that, before energizing the machine and after checking that the installation of input conductors and external devices for overcurrent protection are properly installed, the supply voltage matches the transformer primary voltage and the internal overcurretn device is properly installed.
The failure in meeting these requirements may cause damages and risks of customer responsibility.
The Power Supply Line must be provided with balanced phase. Nominal input voltage must not exceed ±10% variation.
The nominal machine power is established and warranted only under the nominal voltage. Frequency of 50 or 60 Hz must have variation within 1 Hz.

Provide an individual electric extension for each machine. The extension conductors and protection elements must be set according to the rated voltage of the network and the table “Machine’s electrical data” below:

MACHINE’S ELECTRICAL DATA

Power (KVA)	Tension (VCA)	Current (A)	Cable Section mm²
50	200	144	35
	210	137	
	220	131	
	230	126	
	240	120	
	250	115	
	360	80	25
	380	76	
	390	74	
	410	70	
	420	69	
	440	66	
	460	63	
	480	60	

When the trunk’s length is larger above 30 meters, the cable must be redimensioned.

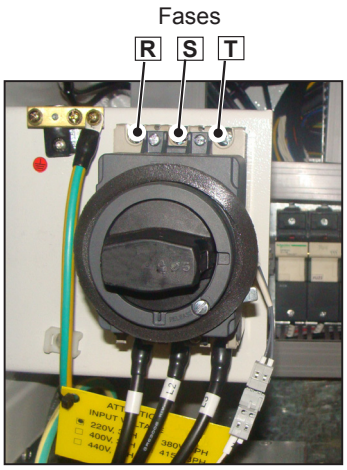
NOTE
The rated power of the machine is achieved and guaranteed only under the rated voltage.

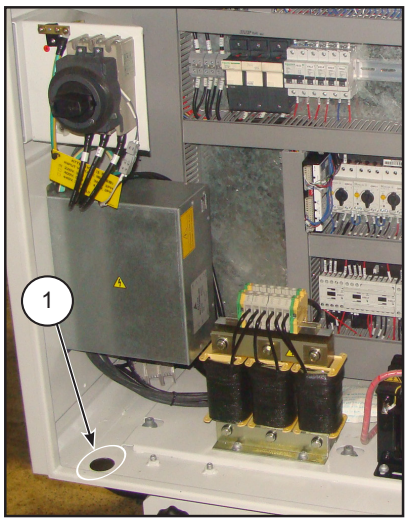
5.4.2. Power supply phase sequence

Make sure that the phase sequence of the voltage supplied is correct so the electric motors run according to the direction indicated.
When the hydraulic unit is present in the machine observe the oil pressure provided by the unit. A sequence of incorrect steps lead to the machine in emergency stop conditions.

5.4.3. Electric Power Entry

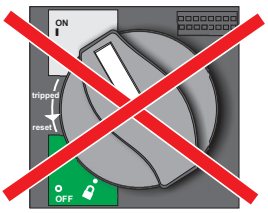
The electrical installation of the machine (correctly dimensioned) must be provided from the power supply until the master switch located inside the electrical panel.





Internal Electric Panel View

ENTRY HOLE FOR FOOD (1)
Ø 40MM



WARNING

Never Turn on the Master Switch when you are preparing the machine for the electrical installation.

The cabling of the master switch must be performed only be the applicable technicians.

5.4.4. Considerations on the power supply line wiring

The conductor section must be specified according to the voltage line and the machine's power capacity. Also, consider the voltage drop due to the distance between the machine and the distribution point.

5.4.5. Grounding

WARNING

1. Check the applicable local guidelines to prepare the grounding.
2. For the correct dimensioning and installation of the grounding it is necessary to hire a specialist company.
3. If grounding does not meet below specification it may cause the loss of garantee.

SPECIFICATION

- Ensure exclusive grounding for the machine with a resistance lower or equal to 5 (five) ohms, dimentioned according to the installed power. In the case of more than one machine, they may be installed in the same grounding as long as, to make the links, are used independent protection conductors;
- The grouding, preferably, must be built as near to the machine as possible, and if its away, it must avoid passing nneat electric feeding lines;
- The ground cable section must be equal to the section of the machine's feeding cable. This cable is necessary for the safety of the operator and correct operation of the equipment.

Identification of the link point of the grouding cable (located in the internal part of the Electric Panel)

5.4.6. Verification of all the Electrical Interconnects

Always turn off the Master Switch before having access to the electrical cabinet.
Never attempt to access any internal components when the machine is energized, under penalty of occurring injury.
Make sure that the steps below are followed before energizing the machine for the first time.
Is strongly recommended that all electrical connection is inspected and tightened again, using appropriate tool during the machine installation procedure. Always check loose cables or connections. Check all the connectors used. It is recommended to check loose components inside or outside the switch cabinet.

5.5. INSTALLATION CONDITIONS

Ambient temperature		Maximum Relative humidity
Minimum	10ºC (50ºF)	<90%, uncondensed
Maximum	40ºC (104ºF)	

For machine installation, a base for central foundation as exemplified in the foundation plan should be prepared, observing whenever the seating surface is flat and free of ripples or level of variation, with maximum permissible limit of 5 mm;

For the correct dimensioning of the foundation base should hire a company specializing in foundations that will consider the necessity of a soil survey;

Through the soil survey, information about the resistance of underground are obtained, their composition and water table level (underground water);

With this information and the value of the maximum loadwill be possible choose and the accurate calculation of the foundation as well as the necessity of staking;

Avoid installing the machine on extremely dirty area, exposed to direct sunlight, subject to excessive temperature changes, vibrations or impacts of nearby equipment;

Make sure that the place of machine installation is big enough to make maintenance easier (See access in Layout machine on Standard Set and Accessories);

It is extremely important the isolation forecast of the foundation base to avoid machine accuracy problems due to vibration and/or impact produced by nearby equipments (shock waves in the soil).

IMPORTANT

Approximate weight (Kgf)

Machine	**9.200**
Maximum Piece	**300**

FOR THE CORRECT DIMENSIONING OF THE FOUNDATION BASE A COMPANY OR A PROFESSIONAL SPECIALIZED IN FOUNDATIONS SHOUD BE HIRED.

WARNING

The tolerances established for the geometry and the machine's overall performance **BE NEGATIVELY AFFECTED** case does not complies with the specifications of anchor and foundation contained herein.

In cases of machines not properly anchored on a foundation, it is understood as prudent to seek for the best geometric situation with the appropriate records in the protocol and service report.

5.6. CLEANING

Before operating the machine, remove completely the protecting grease from metallic surfaces, by using solvents, such as petroleum ether, trichloroethylene or petroleum-based purifying agents.
Avoid the utilization of solvents containing dichloroethane, methylene chloride or acetone!
After cleaning, lubricate the metallic parts by using lubricant oil, grade DIN 51502 CGLP68, specific for guide lubrication.

IMPORTANT

- Never move the table or tailstock before their guides would be duly clean and lubricated.

5.7. FOUNDATION PLANT, MACHINING LAYOUT AND EXTERNAL LAYOUT

The foundation plant drawings (U02885), machining layout (U03742) and external layout (U26873) available at the end of this manual, are all related information:

- Foundation base construction
- Occupied area
- Positioning accessories
- Machining Layout

CHAPTER 6

OPERATOR INSPECTION

This chapter has the purpose contributing, via routine inspections, for a better machine performance and assisting its preventive maintenance. Thus, in case of any non-compliance problem observed by the operator, the Maintenance Manual must be referred to and measures must be taken by the proper team.
The operator must always be attentive and check:

- Cleanliness and organization of the workplace;
- Proper lighting of the workarea;
- Suitable tools for work;
- Position and operation of the safety equipment;
- Eventual presence of any leaks;

6.1. CHECKS AFTER MACHINE INSTALLATION

IMPORTANT

After finishing the machine installation, it must be started up. To do that, check a number of pints, such as lubrication system, cooling system, pneumatic system so to achieve better machine performance, prevent damages and accidents, among other occurrences. These items will be detailed in the following section “Periodical Checks” and ***must*** be also checked before the first operation of the machine.

6.1.1. Power

IMPORTANT

After the electrical connection of the machine, turn on the master switch and check the phase sequence.
One sample test with main motor is enough. If the motor turns in the arrow direction, all the other motors will operate correctly.
When the motor turns in the wrong direction, the phase sequence must be fixed in the power supply and not in the motor being tested!

6.2. PERIODICAL CHECKS

6.2.1. Chip Removal

After each 8-hour shift or in case of excessive chip production, we recommend to clean the mechanical components located within the machine workarea.
Use cooling oil only (specific for CNC machining centers) to clean the workarea inside the machine.
Remove regularly all the chips or any kind of dirt from the machine components, such as: linear guides, tables, turn table, chip guards, etc.
After removing and cleaning completely the dirt from all components, all the metal surfaces must be lubricated with lubricant oil to prevent oxidation.

IMPORTANT

- Do not use solvents that may damage the painted surfaces.
- Never move the tables or head before their guides are properly clean and lubricated.
- Never use compressed air for cleaning. This will carry chips and dirt to the machine components, where they will cause excessive wear.

WARNING

Do not discard chips or coolant in improper places.
The disposal of chips and coolant must be performed by trained people, and must comply with the legal procedures provisioned in the environmental laws in force.

6.3. DAILY INSPECTIONS BEFORE STARTING THE OPERATION

Some machine parts should be inspected daily before starting work and machining operation for better operation and maintenance of the equipment as shown below:

NOTE
This table is intended to guide the machine user on the key components that should be inspected periodically.

ITEMS TO BE INSPECTED BY OPERATOR	Period		
	Daily	Monthly	Semiannual
Check the lubricating oil in lubrication pump and in the cooling tank to ensure they are within specifications. When only half the oil in the tank, immediately complete the total level. The red alarm light comes on in the CNC control panel when the oil level drops to 1/4. Not expect the red light is on to complete the tank.	■		
Before starting the machine, make sure all guides and moving parts are properly lubricated. Check if there is a thin layer of oil on the guides at all times. When the machine remains off for a long time, pay special attention to the lubrication oil.	■		
Make sure the Pneumatic System pressure is 6.0 kg / cm², at the place indicated below.	■		
Prevent air leakage in the pneumatic system. When you hear a “hissing sound”it indicates that there is a leak and should perform the repair.	■		
Check the level indicator to see if the quantity of refrigerant oil is sufficient. Whenever there is a shortage of the refrigerant oil in the cooling tank, this should be replenished.	■		
Keep the spindle cone and tool haft free of dust or chipping in order to not compromised the machine accuracy. Although the shaft has an automatic chip clean, constant cleaning with a soft lint-free cloth should be performed.	■		
Make sure that neither obstacle entered the road of the moving parts of the machine when operating.	■		
Before operating the machine, run a test program at low speed by moving the three axes at the limit. Functional test 10 ~ 20 minutes before operation every day.	■		
Check hydraulic and pneumatic solenoids to avoid any leaks of oil and air, respectively.		■	
Inspect the guides of the three axes (X, Y, Z) regularly. Check whether there are chips or other particles adhering to the guides. Cleaning must be performed in order to prevent scratches caused by friction between these particles and the guides.			■

6.4. RECOMMENDATIONS AND CAUTIONS WITH WATER-SOLUBLE CUT OILS

Reason

- To prevent corrosion on machined parts and/or moving and fixed parts of the machine.
- To prevent removal of machine painting.
- To prevent agression on rubbers, Turcite and plastics of the machine.

Recommendations

- Acquire product with proven quality, which fulfils the standards referred herein.
- Only use mineral base product with at least 60% of mineral oil in its composition. The percentage must be warranted by the supplier.

Note: Mineral base products do not attack so intensely paints and elastomers.

- Prevent contamination by solvents and organic or inorganic debris.

Cautions

- Select a product capable of emulsionizing floating foreign oils to minimize the contamination effects from lubricant oils for guides and bars.
- Choose a product with formula that accepts treatment with auxiliary products: emulsion activators, bactericides, fungicides, etc...
- Control pH of the new product emulsion, diluted in water from the public mains piping. pH must be from 9.4 to 9.9 during the first 24/48 hours of use; after that, 9.0 to 9.4. The check may be performed with pocket pH meter or by using pH metering paper tape, asily found at resellers of chemicals and lab equipment.

Note: Products with adjusted alkalinity provide good washing for machines, parts and tools, without causing damages to the operators' skin.

- Control the product emulsion concentration by using refractometer, acid break or any other mean available.
- Control anti-corrosion protection, according to **DIN 51360 part 1 and/or DIN 51360 part 2** standards.

DIN 51360 - Part 1

This test simulates the corrosion caused by steel chips on moving and fixed parts of the machine during machining operation, by using low quality or degraded soluble oils

Corrosion test ***"steel chips/FOFO chuck GG-25"***, for new or used cutting oils.

The test comprises the placement of 2 g of steel chips (Herbert chip or equivalent) on a FOFO GG-25 chuck (Ø100mm x 6mm), and the addition on the chips over the chuck of 2 ml of emulsion in use or emulsion of new product to be tested. The assembly must be placed in wet ambient, prepared according to the standard, during 24 hours. The result is indicated by two letters, S (black spotting), and R (rust), followed by the grade reached, from ZERO to SIX, in function of the percentage of area attacked.

The test of the product to be used, diluted in water, must provide a result "S0R0" (S ZERO/R ZERO) for emulsions at 3%; otherwise, treat the emulsion being used or replace it, as recommended by the supplier.

Corrosion Grade	Meaning	Description of Affected Area (%)
0	Without Corrosion	Zero
1	Signs of Corrosion	Máx. 3 Corrosion Points Máx. 1mm diameter
2	Light Corrosion	Up to 10%
3	Moderate Corrosion	Over 10%, up to 25%
4	Pronounced Corrosion	Over 25%, up to 50%
5	Hard Corrosion	Over 50%, up to 75%
6	Very Hard Corrosion	Over 75%

DIN 51360 - Part 2

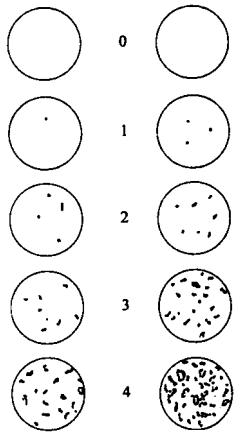
This test indicates beginning of generalized corrosion on machines, parts and tools, caused by the utilization of low quality or degraded soluble oils, providing, in the lower grades, indication of the occurrence before appearing visible corrosion signs.

Corrosion test ***"chips/filter paper"***
for new or used cutting oils.

The test has the minimum duration of two hours and maximum duration of two hours and ten minutes. The test comprises the placement of 2 g of standard steel FOFO GG-30 chips on a qualitative filter paper disc already inserted in a glass container with lid (PETRI DISH) proper for the test adequado para o teste. 2 ml of emulsion of new product diluted in water or of emulsion in use will be poured on the chips to test it in terms of operating characteristics. Once elapsed the expected time, the chips are discarded and the result is read by comparing the filter paper surface with the pattern established by the standard.

For example, no corrosion point = ZERO DEGREE. According to the number of rust points (% of the filter paper area) the corrosion degree to be caused on the machine, parts, aggregates, etc. will be determined.

The test of the product to be used, diluted in water, must provide a result "ZERO DEGREE" for emulsions at 5%; otherwise, treat the emulsion being used or replace it, as recommended by the supplier.



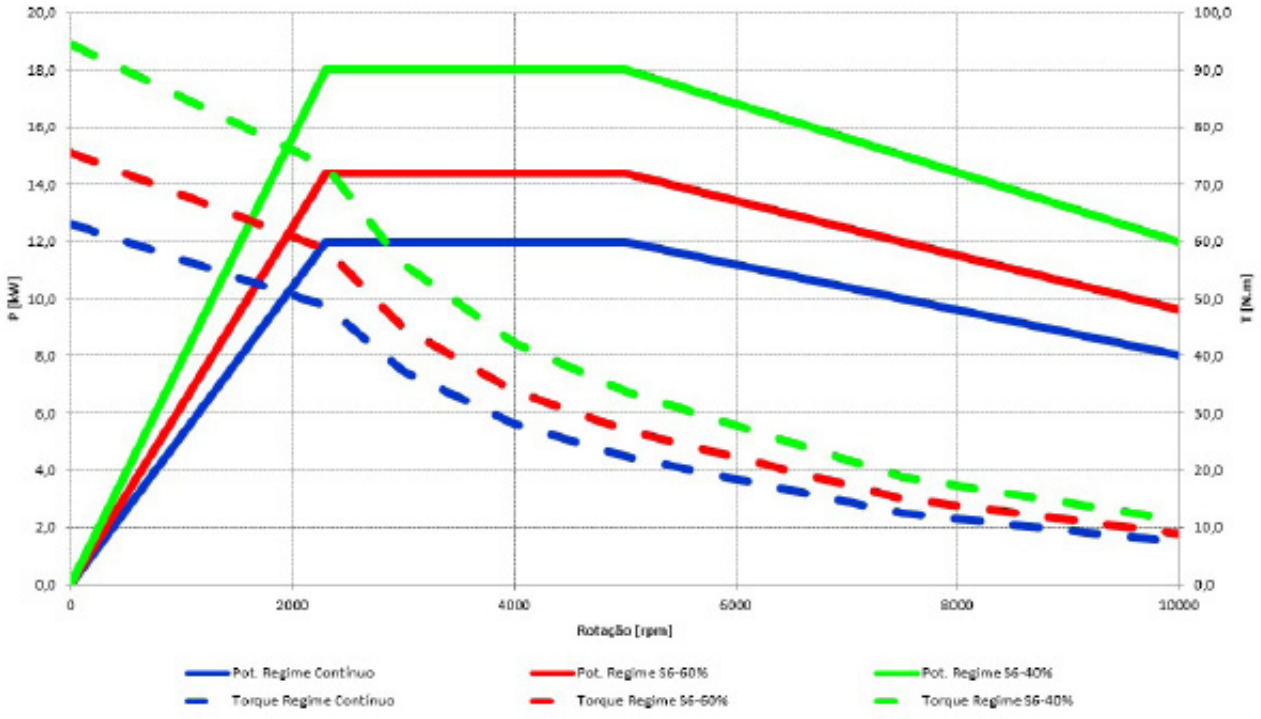
Corrosion Grade	Meaning	Description of Affected Area (%)
0	Without Corrosion	Unchanged
1	Signs of Corrosion	Maximum 3 corrosion signs Maximum 1 mm diameter
2	Light Corrosion	No more than 1% of the surface, however more than grade 1 or larger smudges.
3	Moderate Corrosion	Over 1% of the surface, however no more than 5% of the surface.
4	Pronounced Corrosion	Over 5%

CHAPTER 7

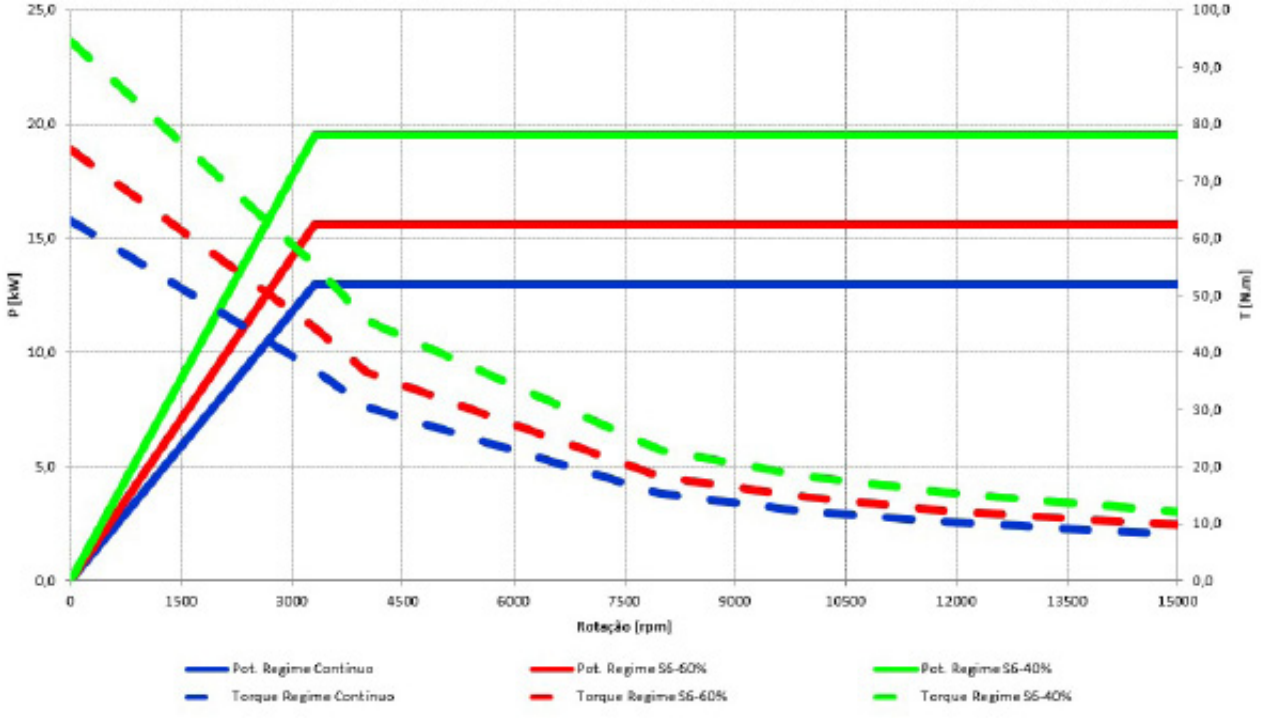
POWER CHARTS AND TOOLS

7.1. POWER CHARTS

ROMI DCM 620 5F - V3 HEADSTOCK 10.000 RPM



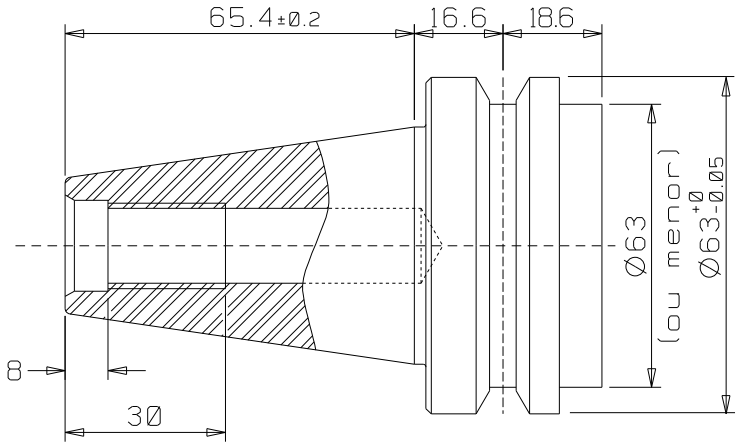
ROMI DCM 620 5F - V3 HEADSTOCK 15.000 RPM



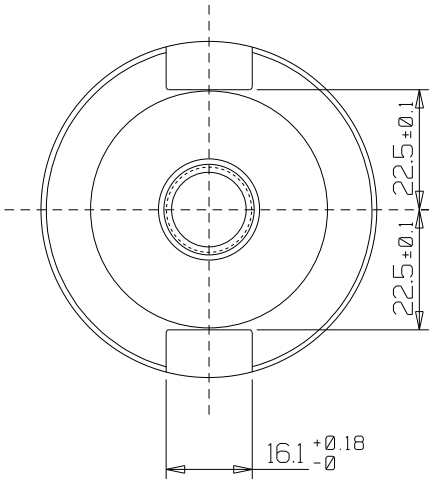
7.2. MANDREL AND PULL STUD

- **Mandrel BT-40**

BT-40

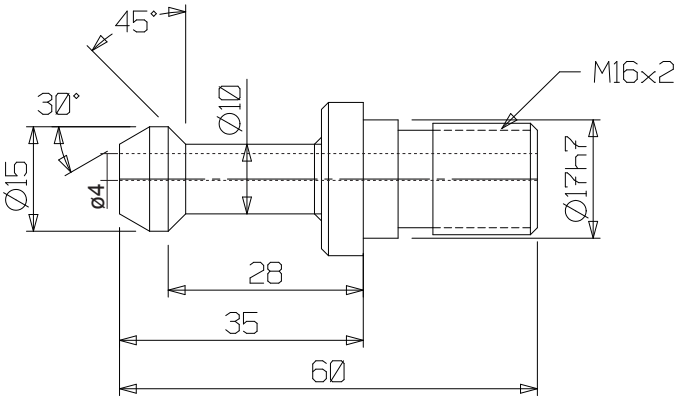


MAS 403-BT40



- **Pull stud MAS 407-P40T-I**

BT-40



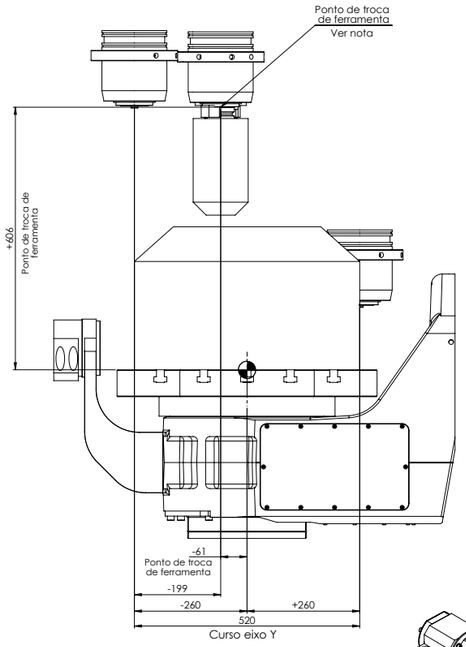
Single piece provision	
R46540	Pull stud BT40 without hole for cooling
S20523	Pull stud BT40 with hole for cooling

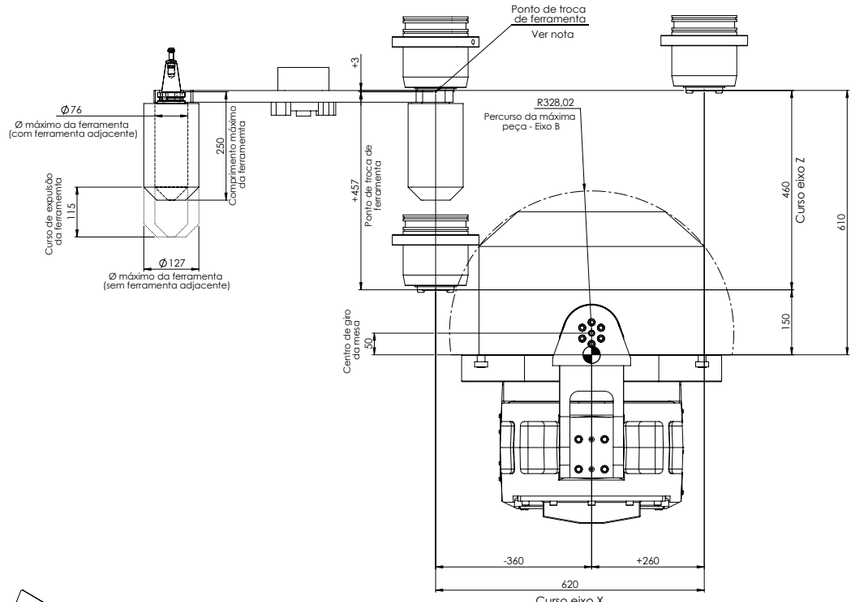
DIMENSIONS EM MM

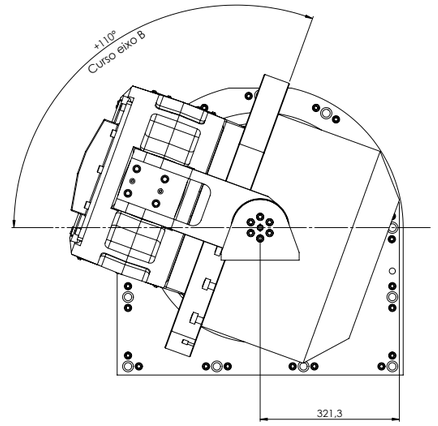
CHAPTER 8

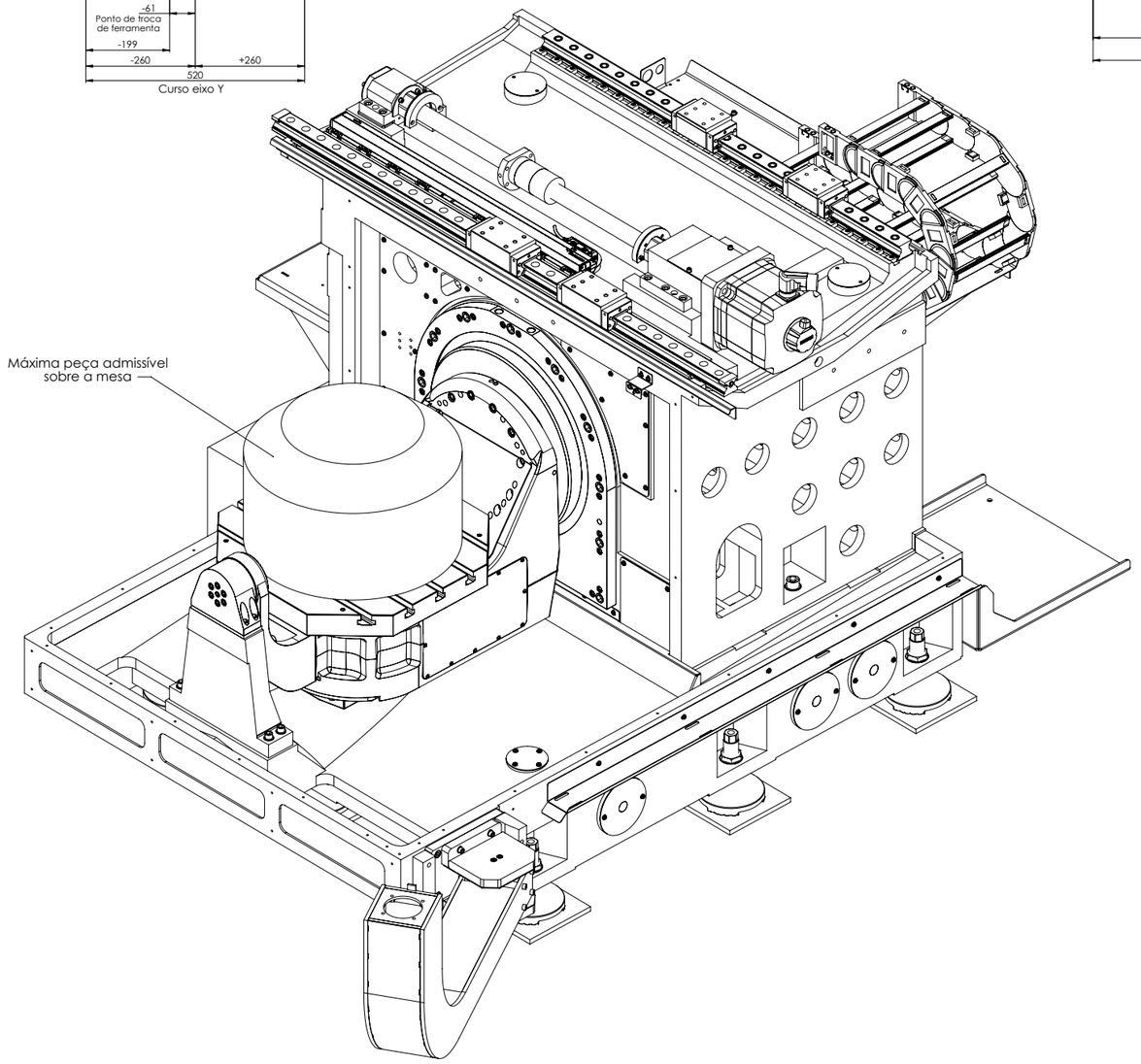
ATTACHMENTS

LAYOU DE USINAGEM - MÁQUINA STANDARD

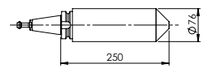




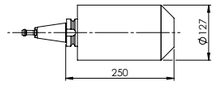




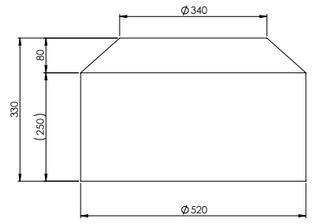
Dimensões da máxima da ferramenta (com ferramenta adjacente)



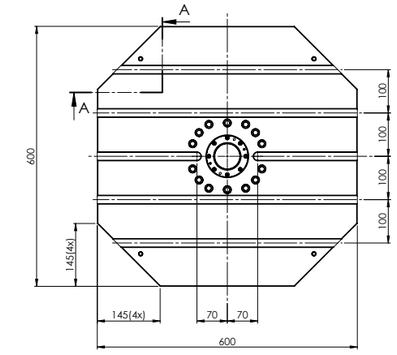
Dimensões da máxima da ferramenta (sem ferramenta adjacente)

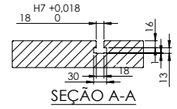


Dimensões da máxima peça admissível sobre a mesa

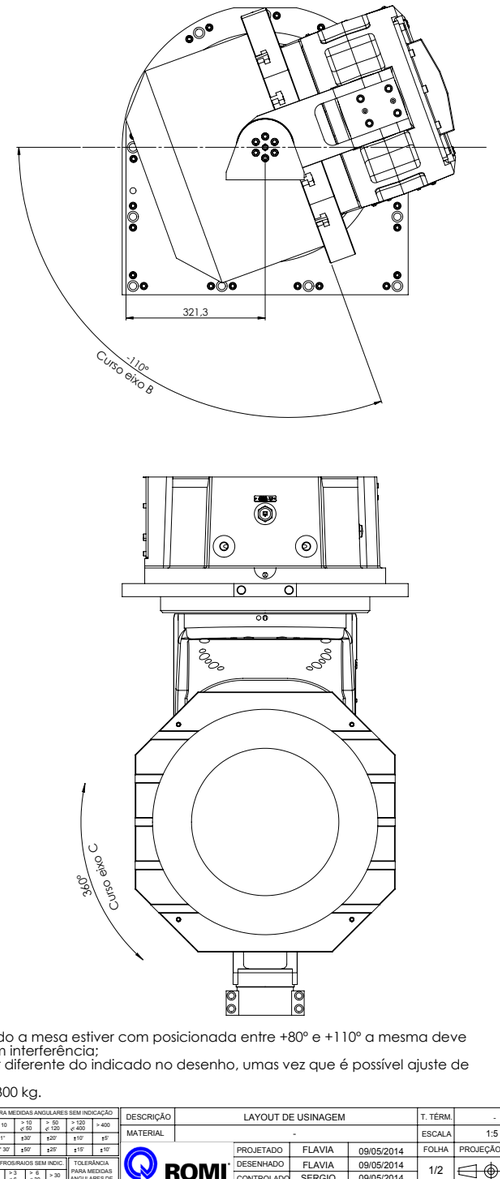


Dimensões da mesa





SEÇÃO A-A



NOTAS:
- Para efetuar a troca de ferramenta quando a mesa estiver com posicionada entre +80° e +110° a mesma deve retornar à +80° para ser possível a troca sem interferência;
- O ponto de troca de ferramenta pode ser diferente do indicado no desenho, umas vez que é possível ajuste de montagem;
- Massa máxima admissível sobre a mesa: 300 kg.

ED.	MODIFICAÇÃO	MODIF.	APROV.	DATA

TOLERÂNCIAS (mm) PARA MEDIDAS LINEARES SEM INDICAÇÃO								
MEDIDA ESPECIFICADA	≤ 6	> 6 ≤ 30	> 30 ≤ 120	> 120 ≤ 400	> 400 ≤ 1000	> 1000 ≤ 2000	> 2000 ≤ 4000	> 4000
USINADA	±0,1	±0,2	±0,3	±0,5	±0,8	±1,5	±2	±3
	±0,2	±0,5	±0,8	±1,5	±2	±3	±4	±5

TOLERÂNC. PARA MEDIDAS ANGULARES SEM INDICAÇÃO					
MEDIDA LADO MENOR DO ÂNG.	≤ 10	> 10 ≤ 50	> 50 ≤ 120	> 120 ≤ 400	> 400
USINADA	±1°	±30'	±20'	±10'	±5'
NÃO USINADA	±1°30'	±50'	±25'	±15'	±10'

TOL.(mm) P/ CHANFROS/RAIOS SEM INDIC.				TOLERÂNCIA PARA MEDIDAS ANGULARES DE CHANFROS SEM INDICAÇÃO
MEDIDA ESPECIFICADA	≤ 3	> 3 ≤ 6	> 6 ≤ 30	> 30
USINADA	±0,5	±0,5	±1,0	±2,0
NÃO USINADA	±0,5	±1,0	±2,0	±4,0

±7°

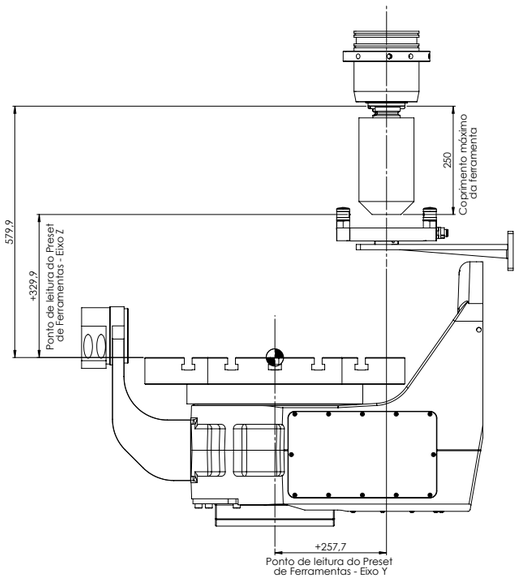
DESCRIÇÃO	LAYOUT DE USINAGEM	T. TÉRM.	-
MATERIAL	-	ESCALA	1:5

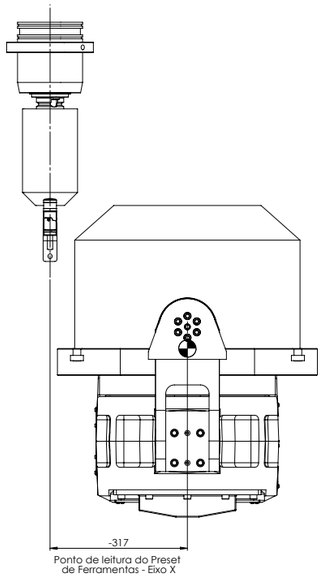
PROJETADO	FLAVIA	09/05/2014	FOLHA	PROJEÇÃO / FORM.
DESENHADO	FLAVIA	09/05/2014	1/2	A0
CONTROLADO	SERGIO	09/05/2014		

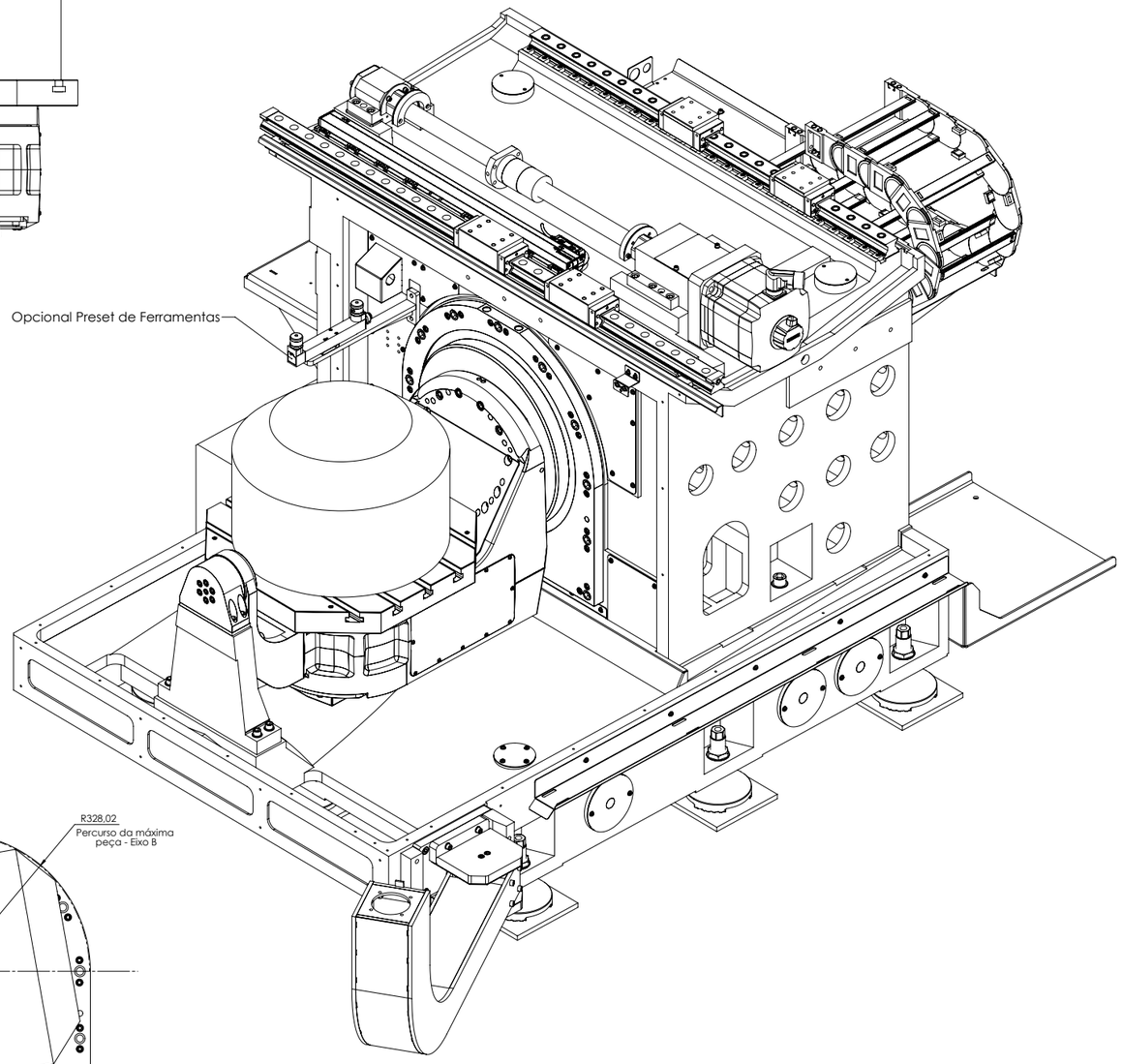
REFERÊNCIA	Nº REF. MODELO	APLICAÇÃO	Nº
U16538	-	P420	U21153A

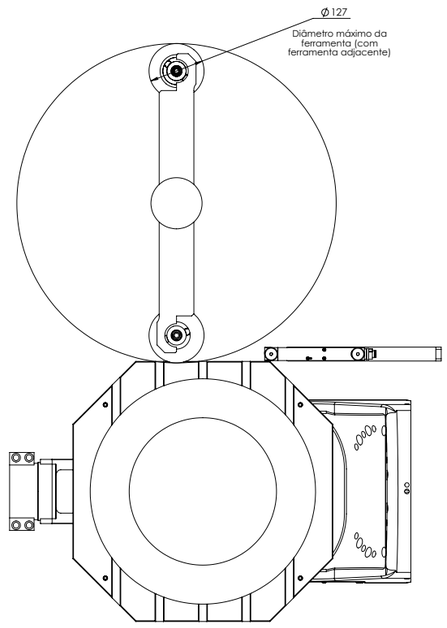
NORMA NBR 8.4 A - UNIDADES EM mm, APARÊNCIA, DISTRIBUIÇÃO E ACABAMENTO DE ACORDO COM A NORMA. É PROIBIDO COPIAR, ALTERAR E DISTRIBUIR SEM AUTORIZAÇÃO. TODOS OS DIREITOS RESERVADOS

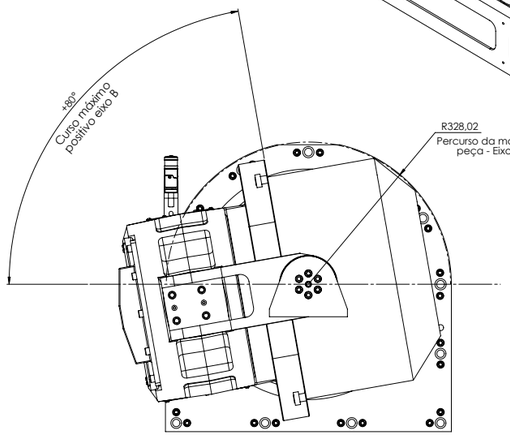
LAYOU DE USINAGEM - MÁQUINA COM OPCIONAL PRESET DE FERRAMENTAS


579,9
+329,9
Ponto de leitura do Preset de Ferramentas - Eixo Z
250
Comprimento máximo da ferramenta
+257,7
Ponto de leitura do Preset de Ferramentas - Eixo Y









NOTA:
- Curso máximo no Eixo B: +80°
- Para efetuar a troca de ferramentas com o presset laser o movimento do eixo Y não poderá ocorrer simultaneamente com o movimento de X. Neste caso deverá ser deslocado o eixo Y até a coordenada de troca para que então possa ser deslocado o cabeçote em X.

ED.	MODIFICAÇÃO	MODIF.	APROV.	DATA.

TOLERÂNCIAS (mm) PARA MEDIDAS LINEARES SEM INDICAÇÃO									
MEDIDA ESPECIFICADA	≤ 6	> 6 ≤ 30	> 30 ≤ 120	> 120 ≤ 400	> 400 ≤ 1000	> 1000 ≤ 2000	> 2000 ≤ 4000	> 4000
USINADA	±0,1	±0,2	±0,3	±0,5	±0,8	±1,5	±2	±3
	±0,2	±0,5	±0,8	±1,5	±2	±3	±4	±5

TOLERÂNC. PARA MEDIDAS ANGULARES SEM INDICAÇÃO					
MEDIDA LADO MENOR DO ANG.	≤ 10	> 10 ≤ 50	> 50 ≤ 120	> 120 ≤ 400	> 400
USINADA	±1°	±30'	±20'	±10'	±5'
NÃO USINADA	±1° 30'	±50'	±25'	±15'	±10'

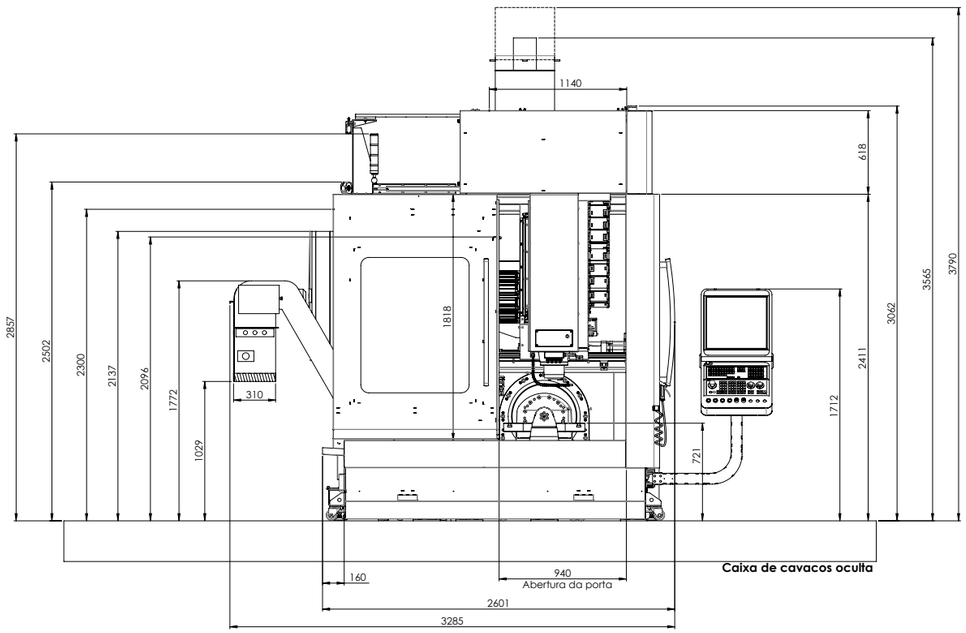
TOL.(mm) P/ CHANFROS/RAIOS SEM INDIC.				
MEDIDA ESPECIFICADA	≤ 3	> 3 ≤ 6	> 6 ≤ 30	> 30
USINADA	±0,5	±0,5	±1,0	±2,0
NÃO USINADA	±0,5	±1,0	±2,0	±4,0

TOLERÂNCIA PARA MEDIDAS ANGULARES DE CHANFROS SEM INDICAÇÃO
±3°

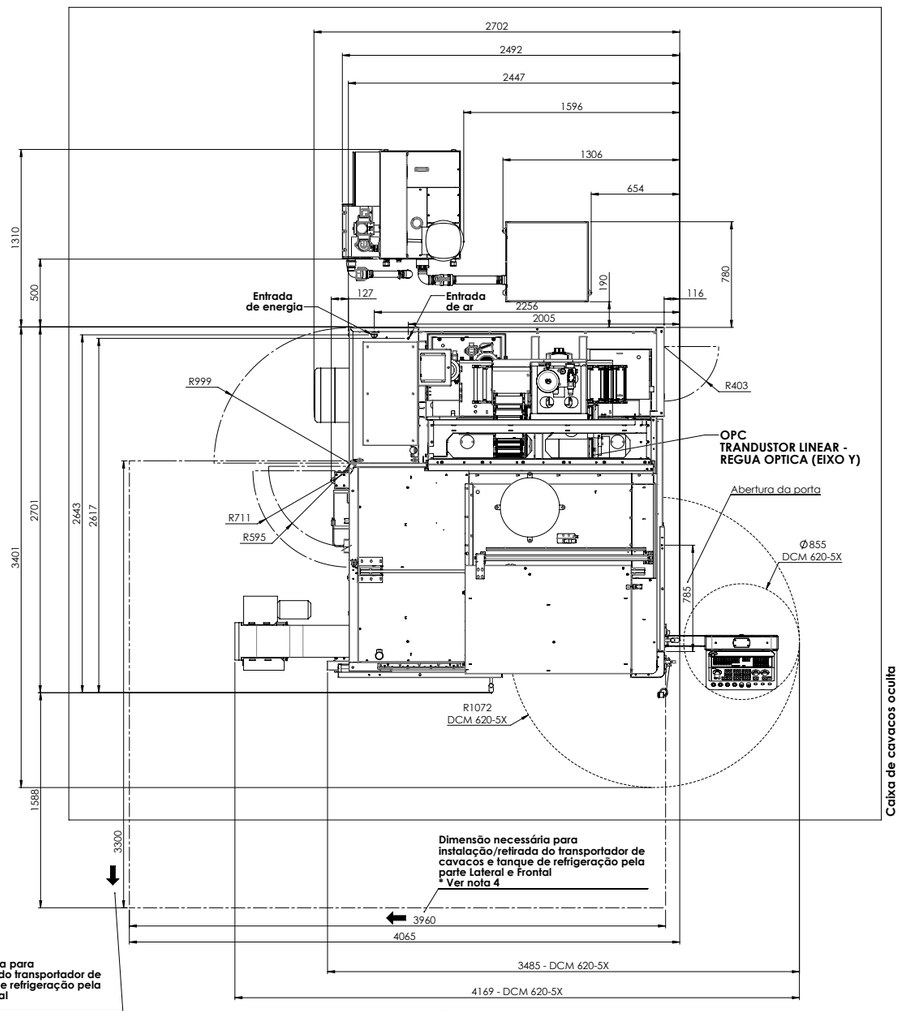
DESCRIÇÃO	LAYOUT DE USINAGEM	T. TÉRM.	-
MATERIAL	-	ESCALA	1:5
PROJETADO	FLAVIA	09/05/2014	FOLHA 2/2
DESENHADO	FLAVIA	09/05/2014	PROJEÇÃO A0
CONTROLADO	SERGIO	09/05/2014	FORM.
REFERÊNCIA U16538	Nº REF. MODELO -	APLICAÇÃO P420	Nº U21153A

ROMI

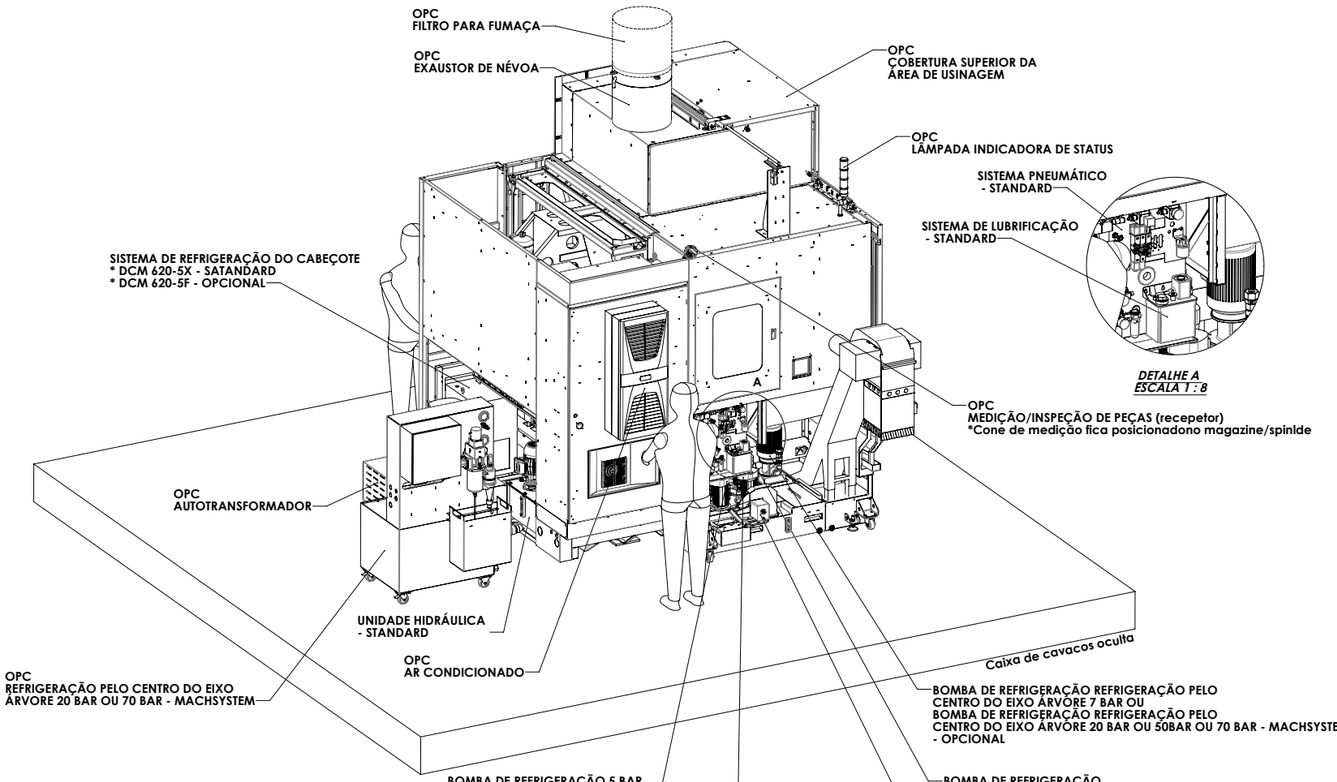
ROMI S/A - UNIDADE FUNDIÇÃO, USINAGEM, DESENVOLVIMENTO E MONTAGEM DE MÁQUINAS FERRAMENTAS. É PROIBIDO COPIAR, ALTERAR OU DIVULGAR SEM AUTORIZAÇÃO. TODOS OS DIREITOS RESERVADOS.



VISTA FRONTAL



VISTA SUPERIOR



NOTAS:
1- Opcional "Esfera de Calibração" fica posicionado sobre a mesa, não possuindo local específico sobre a mesma;
2 - O item "ENCODER PARA EIXO B/C" fica localizado na mesa, na parte traseira e no interior. Esse item esta disponível somente para o modelo DCM 620-5X. Para o modelo DCM 620-5F o item é opcional;
3- Layout externo da máquina básica (sem opcionais): DCM 620-5X: 3485x2699x 2745 mm
DCM 620-5F: 3417x2699x 2745 mm
* Verificar abertura das portas;
4- Para retirada do tranportador de cavacos e tanque de refrigeração pela parte Frontal e Lateral juntas é necessário retira-los primeiro aproximadamente 820mm (até não ter interferência das bombas com a máquina) na parte lateral, e posteriormente 1600 mm na frontal. Para retirada dos mesmos somente pela lateral, é necessário retira-los 3250mm;
5- Altura da máquina básica com cabeçote no curso mínimo: 2745mm
6- Altura da máquina básica com cabeçote no curso máximo: 2873mm
7- Altura máxima da máquina (com opcionais): 3790mm
8- Dimensões de altura podem variar até 40mm devido ao nivelamento da máquina.

ED.	MODIFICAÇÃO	MODIF.	APROV.	DATA

TOLERÂNCIAS (mm) PARA MEDIDAS LINEARES SEM INDICAÇÃO								
MEDIDA ESPECIFICADA	≤ 6	> 6 ≤ 30	> 30 ≤ 120	> 120 ≤ 400	> 400 ≤ 1000	> 1000 ≤ 2000	> 2000 ≤ 4000	> 4000
USINADA	±0,1	±0,2	±0,3	±0,5	±0,8	±1,5	±2	±3
NÃO USINADA	±0,2	±0,5	±0,8	±1,5	±2	±3	±4	±5

TOLERÂNC. PARA MEDIDAS ANGULARES SEM INDICAÇÃO					
MEDIDA LADO MENOR DO ÂNG.	≤ 10	> 10 ≤ 50	> 50 ≤ 120	> 120 ≤ 400	> 400
USINADA	±1°	±30'	±20'	±10'	±5'
NÃO USINADA	±1°30'	±50'	±25'	±15'	±10'

TOL.(mm) P/ CHANFROS/RAIOS SEM INDIC.				TOLERÂNCIA PARA MEDIDAS ANGULARES DE CHANFROS SEM INDICAÇÃO
MEDIDA ESPECIFICADA	≤ 3	> 3 ≤ 6	> 6 ≤ 30	> 30
USINADA	±0,5	±0,5	±1,0	±2,0
NÃO USINADA	±0,5	±1,0	±2,0	±4,0

DESCRIÇÃO	LAYOUT STD E OPC	T. TÉRM.	-
MATERIAL	-	ESCALA	1:16
PROJETADO	FLAVIA	30/10/2014	FOLHA 1/1
DESENHADO	FLAVIA	30/10/2014	PROJEÇÃO A0
CONTROLADO	SERGIO	30/10/2014	FORM.

ROMI
REFERÊNCIA U18058
Nº REF. MODELO -
APLICAÇÃO P420
Nº U26873A

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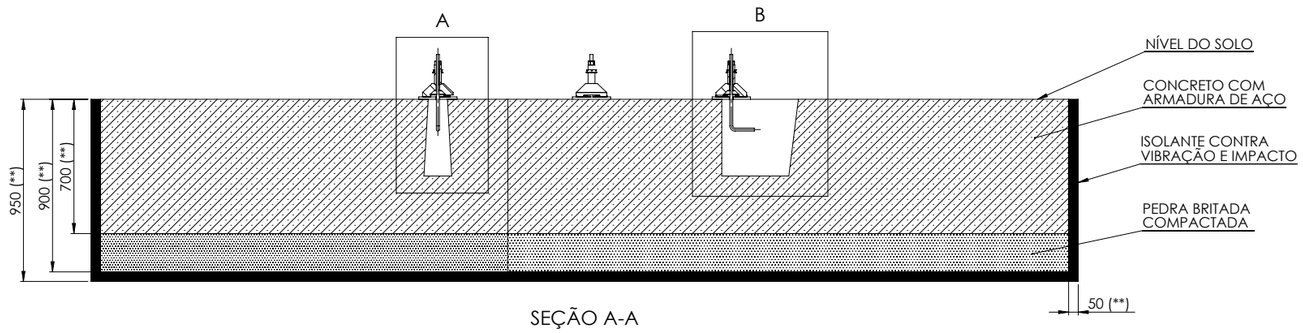
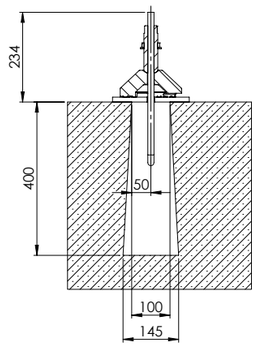
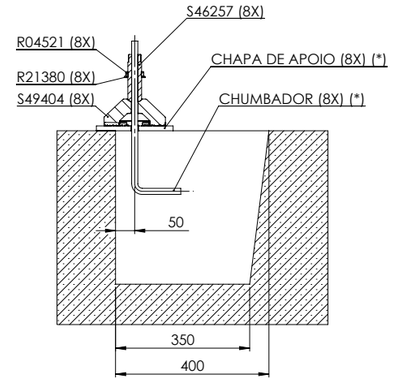


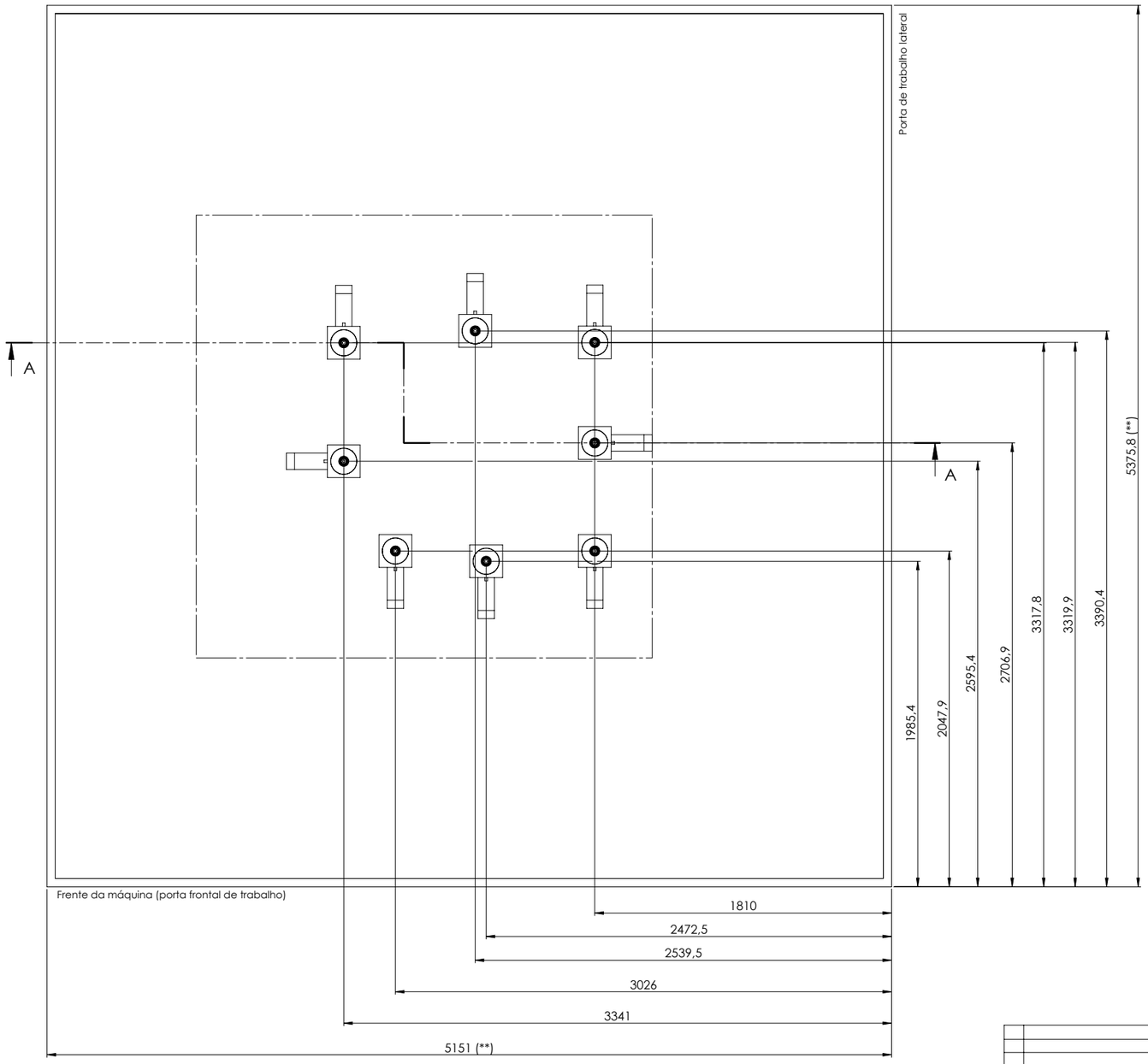
SEÇÃO A-A



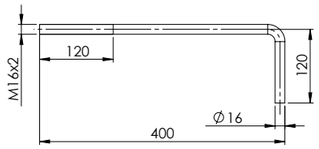
DETALHE A
ESCALA 1 : 8



DETALHE B
ESCALA 1 : 8

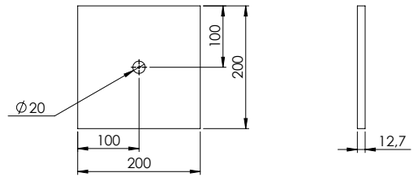


DETALHE CHUMBADOR:



MATERIAL: SAE 1020

DETALHE CHAPA DE APOIO:



MATERIAL: SAE 1020

PROCEDIMENTO PARA BASE DA FUNDAÇÃO

• Para instalação da máquina, deve ser preparada uma base da fundação monobloco conforme exemplificado neste desenho, observando-se sempre que a superfície de assentamento esteja plana e isenta de ondulações ou variação de nível, sendo limite máximo admissível de 5mm;

• Para o correto dimensionamento da base da fundação deve-se contratar uma empresa especializada em fundações que analisará a necessidade de uma sondagem do solo; Através da sondagem do solo, serão obtidas informações sobre a resistência das camadas subterrâneas, sua composição e nível de lençol freático (água no subsolo); Com estas informações e o valor da carga máxima, será possível a escolha e o cálculo preciso da fundação, bem como a necessidade de estaqueamento;

• Evitar a instalação da máquina em área excessivamente suja, exposta diretamente aos raios solares, sujeita à excessiva variação de temperatura, vibrações ou impactos causados por equipamentos próximos;

• Observar se o local de instalação da máquina é suficientemente espaçoso para facilitar a manutenção, operação e instalação de todos acessórios da máquina (vide acessos no Layout);

• É de extrema importância a previsão de isolamento da base da fundação para evitar problemas de precisão da máquina devido a vibração e/ou impacto gerados por equipamentos próximos (ondas de choque no solo);

• Os itens com (*) não são fornecidos com a máquina;

• As dimensões indicadas com (**) deverão ser utilizadas apenas como referência pois o correto dimensionamento depende das condições do solo onde será instalada a máquina.

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ED.	MODIFICAÇÃO	MODIF.	APROV.	DATA

TOLERÂNCIAS (mm) PARA MEDIDAS LINEARES SEM INDICAÇÃO								
MEDIDA ESPECIFICADA	≤ 6	> 6 ≤ 30	> 30 ≤ 120	> 120 ≤ 400	> 400 ≤ 1000	> 1000 ≤ 2000	> 2000 ≤ 4000	> 4000
USINADA	±0.1	±0.2	±0.3	±0.5	±0.8	±1.5	±2	±3
NÃO USINADA	±0.2	±0.5	±0.8	±1.5	±2	±3	±4	±5

TOLERÂNC. PARA MEDIDAS ANGULARES SEM INDICAÇÃO					
MEDIDA LADO MENOR DO ANG	≤ 10	> 10 ≤ 50	> 50 ≤ 120	> 120 ≤ 400	> 400
USINADA	±1°	±30'	±20'	±10'	±5'
NÃO USINADA	±1° 30'	±50'	±25'	±15'	±10'

TOL.(mm) P/ CHANFROS/RAIOS SEM INDIC.					
MEDIDA ESPECIFIC.	≤ 3	> 3 ≤ 6	> 6 ≤ 30	> 30	TOLERÂNCIA PARA MEDIDAS ANGULARES DE CHANFROS SEM INDICAÇÃO
USINADA	±0.5	±0.5	±1.0	±2.0	±3°
NÃO USINADA	±0.5	±1.0	±2.0	±4.0	

DESCRIÇÃO	PLANTA DE FUNDACAO			T. TÉRM.	-
MATERIAL	-			ESCALA	1:16
ROMI	PROJETADO	FLAVIA	03/02/2014	FOLHA	PROJEÇÃO / FORM.
	DESENHADO	FLAVIA	03/02/2014	1/1	A1
	CONTROLADO	SERGIO	03/02/2014		
REFERÊNCIA T96779	N° REF. MODELO -		APLICAÇÃO P420	N° U18005ASLD	

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